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Prevention of Blindness on the Home Front*

Eleanor Brown Merrill

DISCUSSES status of prevention of blindness movement in United States, based upon questionnaire study of official and voluntary State and local agencies.

TEN years ago, there were comparatively few State programs for the prevention of blindness—according to record in the office of the National Society for Prevention of Blindness, 4 voluntary societies were in existence in 1935, and 8 state-wide publicly supported programs. In 1933, the Society had count of 32 workers specializing in hospital social service with eye patients (full time or a major portion of it) and 8 in community work for prevention of blindness of medical social nature. Formerly we frequently heard, "But, can you prevent blindness?" We seldom meet with this incredulity today, because of a better-educated public.

In preparation for this discussion, questionnaires were sent to 23 official and voluntary State agencies, and to 15 voluntary local agencies. Replies were received from 18 State and 9 local agencies. If it were possible, I should like to see an analysis with evaluation of the activities and functions; this would be helpful to all of us and a stimulating aid to better performance. But no such analysis is available, nor would the National Society have the temerity to pronounce judgment or feel itself to be the proper arbiter. Let me make clear, at the outset, therefore, that this is a report of present organized activities for the prevention of blindness, as given to us by the responding agencies. It must be explained further that the coverage is not complete, both because of failure to receive some returns as mentioned and because we have been able to address only those

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agencies registered with the National Society and may be omitting others of which we are unaware.

States reporting are: Connecticut, District of Columbia (counted as a State), Florida, Illinois, Kansas, Louisiana, Maine, Maryland, Massachusetts, Minnesota, New Hampshire, New Mexico, New York, Ohio, Tennessee, Virginia, Washington, and West Virginia. Local communities are: Grand Rapids, Michigan; St. Louis, Missouri; Passaic County, New Jersey; Brooklyn and New York City; Philadelphia, Pittsburgh, Wilkes-Barre, and Lancaster, Pennsylvania.

Four of the eighteen State organizations are voluntary societies—two of them supported by Community or War Chest funds though other funds are from time to time available for special projects. Of the remaining, two are administered under the Boards of Education; six through bureaus or commissions for the blind under Departments of Social or Public Welfare; one through the Division for the Blind under the Department of Social Security; two through administration of independent Commissions for the Blind; one directly as a program of the Department of Welfare; one as a division of the State Department of Public Assistance; and one through Services for the Blind in a Division of Health and Welfare.

It is noteworthy that wherever direct responsibility for the program may be placed, prevention of blindness services reach out into many—in some cases, practically all—of the branches of State administration and that there is steadily growing understanding of the part which all must play in achieving results. One State, for example, lists channels through which medical care is obtained for eye cases: the Division for the Blind, the Crippled Children's Commission, the Vocational Rehabilitation Division, the Veteran's Administration, the Indian Service of the Department of the Interior, the Family Welfare Association; and coming down into the local administration of State-directed service: the county departments of welfare, the public health nursing associations, the school ophthalmologists—all having a part in this one aspect of the whole.

The cost of medical care for eye cases, is met by the majority of the States reporting for specified groups eligible for eye care; and case work services for certain groups are provided as a part of the program for the blind or through co-operative arrangements between different groups. In Illinois, the Illinois Society for Preven-

tion of Blindness provides consultation services for the medically indigent not receiving relief; for others eligible for eye care responsibility is borne by the official agency concerned. Similar or slightly varying arrangements are in practice elsewhere. An item of interest reported by Illinois under this section of the questionnaire mentions the checking of all birth records, by the Society, and referral of any violations of the law requiring silver nitrate to the Health Department which follows up the case.

In relation to vision testing, fourteen of the eighteen states put more or less emphasis upon the importance of discovering visual difficulties in children through screening and referral of those needing ophthalmological attention. In some instances, responsibility for this service is assumed by Well-Child Clinics of the Health Department so far as preschool children are concerned and by the local Boards of Education for children of school age; in others, main responsibility for both preschool and school children rests with the State and County Health Departments. In the majority, however, it is borne jointly by these two official agencies, always stimulated—sometimes urged—by the organization primarily concerned with conserving vision; in certain instances, these bodies are continuing to point the way with case-finding projects and demonstrations and through the instruction of personnel. In New York State during a twelve-month period the prevention division of the Bureau of Services for the Blind gave 150 demonstrations of vision testing and 60 special instruction periods resulting in a check upon the eyes of approximately 1500 preschool children; but more important is the establishment of what we may hope to be a continuing procedure under local auspices.

Special education for visually handicapped children (generally referred to as sight-saving classes) rests primarily with the educational authorities, agencies for the prevention of blindness taking a leading part in promoting the establishment of sight-saving classes where there is need, and in bringing about special training for the teachers. It is of interest to note that at latest count 620 sight-saving classes are operating in 218 cities representing 31 states, the District of Columbia and Hawaii.

In regard to rehabilitation, practically all the State agencies reported that they have plans which have been approved or are now

under review in Washington. Reports indicate that main responsibility in this area will generally rest with the State Vocational Rehabilitation Division, at least so far as medical care, training, and placement of the partially seeing are concerned. Plans provide for co-operation from the state prevention of blindness agencies through consultation service; and with the public health administration through case finding.

Less emphasis seems to have been put by the state and local organizations on industrial eye health and safety than on other aspects, except as a part of general public education, according to reports. However, with the war bringing special focus upon the problem of industrial accidents, increased co-operation is noted with Divisions of Industrial Hygiene in encouraging and developing sight conservation procedures. Items from the Kansas report call attention to what might be expected from a Division of Industrial Hygiene, sometimes located within the State Board of Health, sometimes within the Department of Labor; the report states:

> The division has a staff which includes a medical doctor, an engineer, a chemist, etc. It makes appraisals in the various plants which include lighting surveys, checking for the presence of dust and gases which are a source of irritation to the eyes. It does not make a planned check of protective devices worn to conserve eyesight, but takes note as it visits the plants and frequently suggests the use of goggles, and of specific types if the style worn is not adequate. It prepares educational material and enlists co-operation of the nurse, foremen, and employees in planning to decrease the incidence of eye hazards.

Though nothing is said here of the medical aspects, there is, through state industrial hygiene programs, opportunity for discovering eye defects and diseases by properly conducted screening and medical examinations; for correction and treatment of eye conditions through ophthalmological guidance and co-operation; for proper placement on the job through understanding of work requirements and the individual's visual limitations; for adequate first aid provisions and regulation with direction of the medical and nursing staff; for education of management and labor in the principles of eye health and safety. There is opportunity to extend that

education by way of the employees back into the home and family group.

Without prodding from agencies concerned especially with eye health, the programs for safety and hygiene in industry will in large measure be general in nature, and ignore many factors which are significant from our standpoint. Here is where several states have entered the picture in undertaking special projects. A program in Illinois for screening, job analysis and safety surveys should provide data and point the way for future action. Study of records from the Workman's Compensation Commission in Kansas gives convincing material for the Division's use with industrial and safety personnel. New York has initiated meetings with the Division of Industrial Hygiene to consider revision of the State Safety Codes in order to provide greater eye protection in industry. With the success of these efforts, other states may be able to add their influence in bringing about better industrial safety practices.

Of the nine local voluntary agencies reporting, the Wilkes-Barre and Pittsburgh branches of the Pennsylvania Association for the Blind mention distribution of educational material in industry as definite projects in this field. Findings of the industrial study of the National Society for the Prevention of Blindness gave the basis for preparation of material and approach to the United States Public Health Service for assistance, who assigned an ophthalmologist to the Society for work in the industrial field; and close working relations were established with the Division of Industrial Hygiene of the Public Health Service.

Late in 1943 a project was begun in co-operation with the Connecticut State Department of Health for the three-fold purpose of obtaining a picture of industrial vision practices in a typical concentrated industrial region engaged largely in war work; trying out various methods of screening tests and procedures for visual examinations; and formulating recommendations for methods of appraising and improving existing visual conditions in industry to serve as a pattern elsewhere.

The Society's *Manual and Appraisal Form on Conservation and Utilization of Eyesight in Industry* has been circulated to some extent and arrangements are under way for an extended mailing to industry through government channels; servicing of returns will in-

clude, according to plans, the follow-up of shortcomings reported with practical recommendations for improvement. It is believed that as a result of steps taken there will be an increasing demand for ophthalmologists. Therefore, with the co-operation of the Joint Committee on Industrial Ophthalmology of the American Academy of Ophthalmology and Otolaryngology and the American Medical Association, the National Society held a Seminar in Industrial Ophthalmology, for which 99 ophthalmologists registered. It may be an introductory step with other similar or more thorough courses to follow; we are not able to say at the moment.

On looking through the reporting from both state and local sources it is interesting to see the number and variety of special projects that have been undertaken. New Hampshire has developed a special eye record form for use in examining applicants for driver's licenses. New York has established an orthoptic center in an upstate city by the loan of a technician for demonstration purposes and enlistment of local support. Illinois has undertaken a joint demonstration with Cook County Bureau of Public Welfare in restoring sight to those on the blind pension list. Kansas has instituted a program of follow-up of men rejected for military service which includes medical care to those eligible and referral to the division of vocational rehabilitation. New York, with local co-operation, has conducted certain studies in the incidence of new blindness and in the treatment of ophthalmia neonatorum and trachoma cases. Louisiana and Maryland have undertaken special studies of registers of the blind to determine causes. Maine, Illinois, Lancaster (Pennsylvania), Brooklyn (New York), and Tennessee all report intensive projects in relation to the development and strengthening of sight-saving classes; Washington mentions a program to stimulate the use of sight-saving material by teachers having visually handicapped children in regular classes and by teachers' colleges. Maryland has engaged in a study of cases given glasses over a two-year period and in a joint project with the Lions Clubs leading to better eye care for children in institutions. Massachusetts, Minnesota, New York, Grand Rapids, St. Louis, Passaic County (New Jersey), have intensified their efforts to correct faulty school eye health conditions; in similar efforts Louisiana and Wilkes-Barre have made special lighting surveys and planned lighting exhibits.

Florida has a project to bring about improved lighting in homes and industry. Washington reports participation with the State Department of Health and the Office of Indian Affairs in a trachoma case-finding and control program. In the District of Columbia plans have been worked out for organizing and carrying a demonstration glaucoma clinic in a leading eye hospital; Minnesota has concentrated on a glaucoma educational program with education of the general practitioner; Philadelphia has developed a program for following up glaucoma patients treated in eleven of the eye clinics, carrying instructions to patients and assuring continued treatment.

The National Society's Committee on Glaucoma was formed, composed of ophthalmological heads of eye services in New York City and representatives from the United Hospital Fund, hospital administrations and the Bureau of Services for the blind. Projects were undertaken in New York City with the object of obtaining better control over glaucoma cases handled in the various eye clinics and demonstrating desirable techniques to be followed in order to discover cases in their earliest stages. The program has included training and use of volunteer assistants for charting fields of vision, taking visions and tensions, developing a file of glaucoma patients, and for other clinical details.

Some other projects with which the National Society has been concerned during the past two years are a study of nursing curricula to bring about increased attention to eyes in the preparation of nurses; continued study of vision-testing techniques; continued sponsoring of training for medical social eye workers (in this connection I'd like to note the training at Washington University last winter of two young women from São Paulo, Brazil, through financial assistance from the Coordinator of Inter-American Affairs); continued sponsorship of training for sight-saving class teachers and publication of the handbook *Education and Health of the Partially Seeing Child;* studies of the schools for the blind in two states with a view to restoration of vision and educational adjustment for the children with sight. This project is a joint one with the American Foundation for the Blind which is considering the problems within its area.

There is expansion in educational activities on all sides as well as broadening co-operation and support, both lay and professional,

judging from the reports. As a liaison agency among official and voluntary national and local groups the National Society carries on an educational program through publications, films, radio broadcasts, lectures, institutes, summer courses, exhibits, conferences, and correspondence. Twenty state medical societies now have conservation of vision committees—a significant contribution to prevention of blindness and one about which I should like to comment further if time allowed.

But let us not be blind to the problems ahead! In response to questionnaires, attention is called to a recognized increase in venereal disease. Special alertness seems called for if a rise in blindness from ophthalmia neonatorum is to be avoided. We have record of increase in industrial eye accidents. Keratoconjunctivitis is reported to have broken out in a number of communities. The danger of increase in various eye infections with return to this country from Europe of our military and civilian forces cannot be overlooked. Eye injuries resulting from the war may make heavy demand upon our resources. Decrease in the number of available eye physicians is serious and there is shortage of other personnel.

These are some of the problems we have to face in the coming months calling for all the strength and ingenuity at our command. But with experience and greater knowledge workers in the prevention of blindness field are able as never before to "preach the gospel" and influence future conditions.

Facing The Cataract Problem

Jack P. Cowen, M.D.

DESCRIBES development of cataract; medical care; when operation is indicated; postoperative care and prospects.

Place of the Cataract in the Life Physiology of the Individual

The onset of cataract in the older individual (and for the present discussion, the subject shall confine itself to the older people) is considered to be the beginning of the end, a disastrous occurrence that spells the onset of blindness. It is considered a dreaded affliction or disease that visits the old, like cancer and diabetes. In some respects, it is a degenerative condition, but should be really considered no more abnormal than the graying of the hair, to which it bears more than superficial resemblance. It is true that the portion of the eye involved has undergone a type of death or disintegration, but this is no more the death of the entire visual organ than graying of the hair means the loss of the hair.

Nature of the Cataract

To most individuals, "cataract" implies anything which clouds the vision, or which is visible as a gray membrane or veil over the cornea, pupil or lid, for that matter. Before we proceed, it would be wise to consider just what is meant by a cataract. A cataract is an opacification of the lens of the eye, so that this focusing structure suffers an impairment of its translucency, and hence distorts the light entering the eye and disturbs vision.

In examining the diagram, we see represented the opening of the camera, which is analogous to the cornea and pupil of the eye. Behind this is a focusing mechanism, a lens, which does the same job as the crystalline lens within the eye. Behind this is the sensitive plate upon which the focused image is thrown. This is analogous to the retina in the human eye. A cataract is a graying or opacity

of this lens, and nothing more. It is a process which occurs slowly, casting its shadow long before it is complete. It is clear that an opacification of the lens in our diagram would effectively blur or block the sight unless something were done to remove it and replace it by a focusing device of equivalent refractive strength. The term

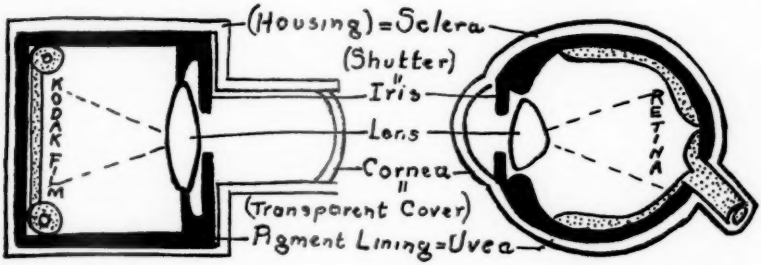

FIGURE 1.—ANALOGOUS STUDY OF THE DIAGRAMMATIC HUMAN EYE WITH THE PHOTOGRAPHIC CAMERA, IN CROSS SECTION

"cataract" is sometimes erroneously used to imply loss of vision when the blame should be laid elsewhere, when whatever lens opacity is present is only minor, or may actually be present as a complication to the real cause of the blindness. Thus, we might conceive of a case in which a tiny bullet has passed through the eyeball, causing blindness by destroying the nerve but causing incidentally a cataract by having damaged the lens on its passage through the eye.

Types of Cataracts

For the sake of completeness, we should discuss the most prominent types of cataracts, irrespective of the age-groups which are affected. The earliest types are those affecting infants and children, called "congenital cataracts." These congenital cataracts are usually present at birth and bespeak an injury or disturbance to the young lens tissue, the cause of which frequently harks back to the period in the infant's intrauterine life.

From the position of the opacities within the lens, the exact period of the infant's life in which the opacity developed can be determined. The lens is a living tissue with a life-history and growth all its own. This growth is from the center or nucleus out-

ward in layers, like an onion-skin; this continues throughout life, so that the lens is constantly enlarging, hiding deeper in its middle, the history of its past. At any time, then, the doctor can determine at about which period the opacity has developed, by noting the stratum or layer in which it is located. Certain types of these cataracts occurring at birth are found to be present in both eyes. They seem to have been formed in the third to the seventh fetal months, and are found in whole families, inherited in a dominant fashion. Disturbance of nutrition and rickets undoubtedly play a large rôle in these cases, as can be substantiated by examining the patient's first teeth.

A word might be said concerning the treatment of these cases. The diminution of vision, of course, depends upon the density of the opacity and the amount of obstruction and distortion to the incoming light. The rough rule as indication for surgical treatment in cases of congenital cataract with poor corrected vision bilaterally is as follows: if the binocular corrected vision can be improved to 20/30 through widened pupils (which permits the light largely to pass around the lens opacity), a permanent surgical enlargement of the pupillary opening should be considered. However, when the pupils are enlarged and the vision binocularly cannot be brought up to 20/40 with correction, then useful vision will be hard to obtain without surgical removal of the affected lens. The glass lens put into the frame before the eyes after operation will supply the light-focussing power of the opaque lens removed from the affected eye.

Senile Cataract

The senile cataract is one of chief interest in this study, and will be taken up in detail later. Briefly, it puts in its appearance around the forty-fifth year, or later, becoming increasingly more frequent in the older age groups. In some families, cataracts appear very early, as does gray hair; in others, it seems never to appear.

Complicated Cataract

As has been outlined before, cataracts can occur at any time, as result of some injury or disturbance to the lens, or to the surrounding ocular tissues. Of those which produce a direct mechanical

injury to the lens, lightning, sunstroke, glass-blowing and steel puddling might be mentioned. Blunt blows or penetrating injuries are direct causes. Materials taken by mouth, as di-nitro-phenol, taken for weight-reducing, have been incriminated. Diseases and conditions which affect the nutrition of the lens, as tetany and diabetes, or those which produce prolonged disease within the eye, as iritis, glaucoma, retinitis pigmentosa, or detachment of the retina may be responsible. In case a cataract forms, it will be seen how the initial ocular disease may be hidden.

Symptoms of Senile Cataract

The first symptoms of a cataract depend somewhat on the position of the opacity in the lens. The most troublesome opacities are central because they first produce a blurring of the distant vision. They are most troublesome when the pupil contracts, forcing the light to traverse through them; hence they produce considerable trouble when the patient tries to read or when he goes into bright daylight or artificial light. In both of these instances, the pupil involuntarily contracts, cutting off all clear rays that might pass around the cataract. At this time, patients are apt to report that "rays" or "dazzling stars" emanate from lights. Objects may ap-

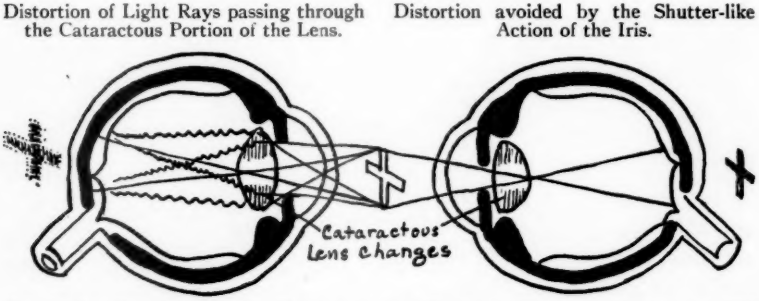
Distortion of Light Rays passing through the Cataractous Portion of the Lens.
Distortion avoided by the Shutter-like Action of the Iris.
Cataractous lens changes

FIGURE 2.—DIAGRAM OF THE EFFECT OF THE CONTRACTION AND DILATION OF THE PUPIL ON PERIPHERALLY-LOCATED OPACITIES OF THE LENS

pear doubled through one eye, or may have colored rings around them. The patient may see the cataract as a "floater," or shadows.

These findings are most quickly picked up if they occur in the patient's master or dominant eye; in the non-dominant eye, the

cataract formation may be so completely unnoticed that discovery that the eye is rendering no service comes as a complete surprise; this, of course, assumes that the mate eye has satisfactory vision.

In contrast to the central lens opacity, an eccentric or peripherally-placed opacity, as illustrated above, disturbs the patient most at twilight or in the movies. Patients state that they are helpless "after five o'clock at night," until the street-lights go on. They sometimes squint their lids to shut out the light that passes through the distorting portion of the lens. This effort produces headache and strain, although these latter symptoms are rare in cataract patients.

Signs of Cataract

After the age of sixty, very little change in glasses is necessary unless there is a disturbance in the refracting system, such as cataract formation. Glasses then suddenly "become too weak or too strong." The latter phenomenon is popularly called "second vision," and the patient is then able to discard his glasses and may read without them. The actual appearance of the cataract, as a graying of the pupil, may be seen, although the opacity that causes the greatest disturbance of vision is one that occurs in the back part of the lens, not easily seen externally; as a matter of fact, the apparent denseness of the cataract from a casual outside look is no criterion of the vision that the patient may have through this eye. Only careful study by the eye physician to see whether the cataract is the real cause of the visual disturbance should settle this matter.

Effect of the Developing Cataract on the Patient

Because of the popular conceptions of cataract, mentioned at the beginning of this discussion, the discovery that a cataract is present, even though it gives no symptoms, is usually a matter of serious concern to the patient. Of course, it is no light matter, although it is not nearly so fraught with perils as the patient is likely to believe. If the cataract is small, out of the line of vision, and if the mate eye can be brought to good vision, with suitable correction, it is unnecessary to burden the patient with the name "cataract." In the first place, the opacity may remain in a stationary condition for many years. It is preferable to refer to it as an "opacity of the lens" and keep it under regular observation and correction.

The knowledge that a cataract is present may cause the patient to become worried about going blind, operation, and so forth. The fear of blindness or of operation might drive the patient into the hands of quacks and charlatans who will milk him of his last cent for eyedrops and medicines to "dissolve the cataracts." It would be as logical to try to dissolve the gray out of gray hair. At present, medical and immunological treatment of lens opacities has proven to be of no definite scientific value, and hence is not considered.

Duty of the Physician to the Cataractous Patient

The most important immediate duty of the physician is that of reassurance that the process is a normal occurrence in advancing age; that the underlying nerve structure of the eye is in perfect condition; and that the patient's visual efficiency will be maintained at its highest level. The patient must also be made to realize his visual limitations, so that he does not attempt such hazardous occupations as driving an automobile, particularly around dusk, or crossing streets against a dazzling sun.

The Time for Surgery

Assuming that the patient comes to the physician regularly, when should the operation be advised? The rule of choice is this: operation is recommended when the better seeing of the two eyes is no longer capable of serving the patient's ordinary needs. Or one hears this rule: remove the cataract when the patient is no longer happy. The practice of waiting until the cataract is "completely ripe" is definitely a thing of the past; newer methods of cataract extraction have been devised to permit operation at almost any time. However, when a cataract comes to ripening or maturity, even though the mate eye still has good vision, surgery is recommended. Permitting a mature cataract to go unoperated leads to hypermaturity, a state in which surgery is more difficult and in which complications may present themselves which may imperil the health of the eye. When only one eye is operated upon, the patient must be forewarned that a state of rivalry will exist between the operated and non-operated eyes, and that glasses cannot be given to correct both of them at once. The better eye will be corrected

with glasses, and the mate eye will assume a subordinate position. If the patient prefers to use the operated eye, the unoperated or "spare eye" may be given its own correction in another frame to use at intervals, as a "matter of practice." He may be assured that the two eyes, when both have been operated upon, will work well together again.

Preoperative Management

Usual medical procedure would be to determine whether one is dealing with a normal eye under the cataract, whether it has the requisite ability to perceive and project light and colors. The doctor will look for evidence of former ocular disease. He will make a thorough-going test for general disease, or see that this is adequately investigated by the patient's general physician. Abscessed teeth and other possible foci of infection must be ferreted out. Careful inventories of the heart and pulmonary systems should be studied; it must be remembered that the patient must lie supine for several days, and shortness of breath or severe coughing may make this impossible. Careful study of the urinary tract and urinalysis may uncover an unsuspected diabetes or an impending urinary obstruction, which might severely upset the convalescent period. Cleanliness and health of the eye itself under consideration, is of paramount importance, and will be carefully watched by the conscientious ophthalmologist.

Surgical Procedure and Management

The patient is hospitalized one or two days before the operation to accustom him to the institution, to try out sedatives, and to insure adequate rest and preoperative treatment. The patient will plan to remain in the hospital for ten to fourteen days. The operation itself is performed under local anesthesia, the patient feeling little beyond the tiny needle-prick under the skin to secure anesthesia. Of course, the patient is adequately quieted by suitable sedatives to "take the edge off" his nervousness and apprehension; many patients wake up the next day and inquire when the operation is to occur, although they may have talked and co-operated nicely during the surgery the day before.

Postoperative Considerations

After hospital discharge, the patient takes it decidedly "easy" at home, and on the doctor's instruction, the patient makes regular office visits, at which times lenses are tried to improve the vision of the operated eye. Such a lens, if satisfactory, can be given as a temporary glass; the patient is ready for this within three to eight weeks, depending on the clearness of the eye and the type of operation performed. When the vision has reached its maximum, a permanent glass is ordered, with an appropriate correction for reading, worn either as a bifocal glass, or as a slip-over lens to focus for the reading range. Usually by this time, about eight weeks, the patient is ready to return to work.

In certain cases following surgery, complications may arise. The most common of these is secondary cataract, a fine web-like membrane which covers the pupillary space. This sufficiently obstructs the vision so that it has to be swept out of the way by a surgical maneuver known as "needling." This requires only a short period of hospitalization, and usually only one needling is necessary to eradicate this membrane. Other complications which may occur post-operatively in the order of their frequency are: hemorrhage, opening of the wound with prolapse of the iris, iritis, secondary glaucoma, and intra-ocular infection.

Outlook for the Operative Patient

Notwithstanding these possible complications, the cataract patient still has the following outlook from a statistical standpoint. Birch-Hirschfeld, drawing the statistics from the files of several thousand unselected clinic cases in one of the large European clinics, found the following results in his operated cataract cases: 93 per cent and up had vision of 20/60 or better; 75 per cent had vision between 20/20 and 20/40; and 50 per cent had perfect vision of 20/20.

Thus cataract, the mental and visual hazard, is reduced by careful study and medical treatment to a condition which can be successfully combatted, so that, after management, the patient is returned to the visual efficiency that he enjoyed thirty years before.

The Eye Problem and Health Education*

Lula P. Dilworth, R.N.

DISCUSSES environmental, hygienic, and medical aspects of school eye health.

THE promotion of eye health is an integral part of the long range objective of education—preparation for a full and satisfactory type of living—personal, vocational and community.

Until recently there has been a tendency for school eye health programs to be concerned chiefly with discovering defects and attempting to have them treated. While this is an essential feature of the work, it is but one segment of the whole. And unfortunately it is the accidental or negative one. As a positive consideration we are challenged to create for every child a school situation which first, will preserve that which is good, and second, will be conducive to uninterrupted, normal growth and development.

The Eye in Education

We have no known means of determining the extent of damage which has resulted solely from extensive use of normal eyes for close work in the school setting. Be that as it may, with the knowledge now available continued exposure of this type is not alone unfair but also unintelligent.

Dr. Charles Sheard of the Mayo Clinic has stated that one-fourth of bodily energy goes into the process of seeing. If there is an eye difficulty, if the light is not correct from the viewpoints of quantity and quality, or if the eye task is too difficult for the eye to perform (poor print, improper writing, poor paper, lack of contrast, lack of correct spacing, etc.), under such conditions the

* Presented under auspices of Division of Health, Safety and Physical Education, New Jersey State Department of Public Instruction.

amount of energy needed to fulfill the eye task is even greater, and, it must be supplied at the expense of some other bodily function.

It is a trite but true statement that our present day school curricula require a very great amount of eye use. This is true, not only during school hours, but, on the junior and especially high school level, much additional eye use is required for homework.

Scientific studies have demonstrated that there are conditions under which both the normal and impaired eye function with maximum efficiency, speed, and comfort. As educators and health workers, we must see that these favorable conditions prevail throughout the school experience, and provide instruction in ways of incorporating these same principles in the home setting and anywhere else, where close eye work is required. This prompts the thesis that eye health is an essential consideration in the over-all planning for the welfare of pupils. It is a concern of each member of the school staff, in every part of the building, and, in relation to each individual child.

Among the factors which operate in a comprehensive plan for efficient and economical use of eye power during the developmental years are the environment, materials and equipment, habits of study or work, knowledge of individual capacities, treatment or correction of defects, special education for pupils with serious defects, and last but of great significance, general health with special emphasis upon nutrition. Recently a noted ophthalmologist told of having seen some half-starved refugee children. He declined to do anything about their eyes until they had had treatment for other physical deficiencies. After good routine care, over a period of time, the need for eye treatment had disappeared entirely.

Going back to the environment, we are faced with the fact that children are compelled to spend a considerable portion of their time in the school setting and therefore it should be safe and hygienic. Factors which bear a definite relationship to eye health are lighting, seating, proper materials and equipment.

Lighting

Correct lighting results when light is (1) adequate in amount—15 foot-candles preferred; (2) properly distributed; (3) properly

diffused and controlled (used when needed); and (4) properly directed (has proper contrasts, and glare is absent).

What is glare and what are its effects? Glare is the unequal stimulation of different parts of the retina by light. When all parts of the visual field are equally stimulated glare is absent. Bright rays of light striking the retina tend to set up a local irritation of the retina. When there is an unequal stimulation of the retina the part receiving the least stimulation experiences a depression of vision. The greater the contrast between the two stimuli the greater the depression of vision in the less stimulated part.

Illumination should be back of the shoulder line of the arm opposite the one the pupil uses in writing.

Considerable progress has been made in lighting schools recently. Walls and ceilings are being finished or refinished in colors having a high reflection factor. An analysis of our own situation will reveal whether our rating is good or falls within a grouping described by Dr. Abel Wollman of Johns Hopkins University as the worst example of lighting within the community.

School Seating

Even with all details of lighting properly provided, poor eye hygiene can be experienced if seating arrangements are incorrect. Accepted standards for seating include: (1) seats adjusted to the growth of the child; (2) desks (of the most desirable type) that can be adjusted to an angle for correct placement of material in regard to eye work (the light which falls on this sheet when held at right angles with my line of vision is increased up to 70 per cent); (3) placement of seats so that they are at about a 30 degree angle away from the window (this prevents glare from the skyline); (4) placement of the teacher's desk in a darker portion of the room so as to leave the best lighted part for pupils; and (5) placement of pupils with eye defects in relation to illumination which will give them the greatest eye comfort.

Some individuals cannot tolerate more than ten foot-candles of light; however, the average person works more efficiently with 15 foot-candles.

Better seating arrangements are noted in many schools but far too many pupils, especially younger ones, are continuing to be ex-

posed to glare from facing windows or other uneven intensities or streaks of light.

Vision Testing

After having determined that the school is a suitable place in which to have children engage in close eye work, the next step is to get an idea of the effectiveness of the mechanism for eye work with which each child is equipped. Since the organ of sight is the chief means of learning, the purposes of education will be defeated at the outset if this pathway is obstructed, and this fact goes unrecognized by the teacher.

Unfortunately screening tests and observations, rather than complete eye examinations are, and for some time must be, our chief means of determining whether visual acuity is normal or otherwise. However, studies have shown that the simple Snellen type test for visual acuity, together with significant observations as reported by teacher, nurse or parent, when compared with the diagnoses of ophthalmologists were more reliable than were two other types of tests studied. This method alone will reveal more needs than ordinarily can be met.

In Massachusetts the Snellen type test, a Maddox rod test and a plus 1.50 sphere test are used. When a pupil fails on the first test the other two are omitted. Of all pupils referred, 86 per cent were found by using the Snellen test; 7 per cent more were discovered by the plus 1.50 sphere test.

The significance of testing visual acuity early in the school experience, preferably in the preschool period, cannot be overemphasized. A complete ophthalmological examination at this time would be economical from the viewpoint of education, health conservation, and vocational interest. Weaknesses in muscle balance—squint—should be recognized and treated at an early age. Excessive hyperopia, if discovered early, often can be brought to normal. Myopia frequently has its onset during the elementary school years, and prompt discovery and treatment can be accomplished only through careful observations and testing.

With proper training, the technique of making screening tests can be mastered by a non-medically trained person. For psychological, as well as health reasons, many teachers are eager to

administer tests to their own pupils. The important consideration is that in each school some good plan be adopted whereby each pupil will have, as a minimum, one screening test a year and that one early in the school year. Changes and accidents do occur during vacation periods of which pupil and parent may both be unaware.

Treatment for Eye Conditions

It should be known that glasses are not a cure-all for eye defects nor, conversely, that the presence of defective vision is in itself an indication of the need for glasses. Among the more serious eye conditions among children, *i. e.* those leading to blindness, refractive errors constitute only 5 per cent—these are chiefly myopes with pathological complications.

Glasses sometimes are used in conjunction with other treatment —after surgery for cataract, or as a part of treatment for correction of squint—but orthoptic training and surgery also may be involved.

To be effective, treatment of eye conditions other than simple error of refraction must be directed at the cause. Important causes are: communicable and other systemic disease, nutritional deficiency, trauma, and prenatal factors, including heredity. These provide clues for follow-up work when pupils return to school following a serious illness or communicable disease. Some authorities require a screening test of vision following each head injury or eye accident.

Another common impression is that the test of visual acuity gives the final answer as to the absence or presence of eyestrain. This also is fallacious. Appearance of the eyes, signs suggesting strain or discomfort, and the child's personal or family history may be more important clues to children requiring follow-up than results of vision tests. A few years ago an eye doctor at the Ford clinic in Detroit said that not one of the children he had seen who had a serious defect of vision would have been overlooked for referral had obvious signs been noted and reported even without a test of vision. On the other hand, a number of individuals who can read the 20 foot line or better at a distance of 20 feet have refractive errors of vision. So we have no sinecure upon which to rely. Tests, history, observations, all together help to tell the story.

It is re-emphasized that the eye is a part of the body, having similar membranes, blood vessels, nerves, etc. It is affected by anything affecting general health and often gives the first clue to disturbances elsewhere in the body, such as malnutrition, focal infections, brain tumors, diabetes or other maladies. Early diagnosis and treatment are essential to prevent severe defects which otherwise may result. Diagnosis and prognosis are infinitely more important than the present degree of vision in determining urgency of treatment. Guides, in general, for referral to physician, recently suggested, are (1) signs of suffering; (2) markedly reduced vision or decreasing vision; and (3) difficulty in reading or other school problems.

Nor does our interest in follow-up end with the one person who has been selected for study. Attention should be directed toward other members of the family in eye conditions caused by syphilis, heredity, or nutritional deficiency.

After a child has received treatment, effective follow-up by the school should include securing from the ophthalmologist information on diagnosis, treatment, and recommendations, e.g., whether glasses are needed, when they are to be worn, what other treatment has been prescribed, restrictions on eye use or the type of special education which is to be provided, and the suggested date for next examinations.

Recommendations

Specific recommendations in carrying out a school eye program are:

1. An exchange of record forms between the school and the ophthalmologist. This presupposes that accurate records of school eye tests of each pupil are kept.

2. Informing physicians of the objectives of the school health procedures and the adjustments the school is in a position to make in educational processes for the child who requires this. These include those for general and vocational education.

3. In certain cases direct, personal conferences between the examiner and appropriate member of the school staff aid in understanding better the child's needs. In all instances the school carries

a continued responsibility to report to the examiner new or continued signs, and indications of improvement.

As an integral part of educational planning, eye health merits careful study. Co-ordinated effort may well be directed toward establishing a wholesome environment, employment of appropriate means of appraising eye health, incorporating sound instruction on eye health in the curriculum, providing special education for pupils with limited sight, employing suitable follow-up measures for treatment of pupils who have eye difficulties, giving suitable vocational counseling in relation to individual ability, and sharing or stimulating interest in the establishment of adequate community resources for promoting eye health for all age levels.

So much can be accomplished in this area of health conservation which will be reflected in more abundant health efficiency and happiness, that all potentialities should be developed in each of our schools as fully as circumstances will permit.

The Relation of Vision Testing to Safety in Industry*

Joseph Lo-Presti, M.D.

PRESENTS some important facts on industrial vision testing; relation of depth perception, color discrimination, muscle imbalance, speed of vision, and age to the job.

Introduction

Vision testing, when carried out in any form, is essentially a highly technical procedure. Analysis and interpretation of information obtained by such methods are even more technical and difficult to follow through. However, we know that the safety engineer or supervisor in his work is interested in applying all types of employee and job data to promote safety. I should therefore like to present today a discussion of the various processes involved in seeing, ways of testing and classifying these, so that their relation to safety is clearly indicated. It should be stressed that this field, industrial vision, is still in a developmental stage. Co-operation among all those involved—the industrial hygienist and the industrial safety man, in particular—is absolutely a prerequisite to the advancement of this development to the stage when we shall be able to make the job safe for vision, and vision both adequate and safe for the job.

Very few physical findings in employee examinations are more important to the safety-minded investigator than those pertaining to eyes. This statement seems to be a sound one until it is challenged—that is, when specific figures, data, and controlled studies are requested. Whenever such detailed information is sought, those of us engaged in industrial eye hygiene are able to cite this or that particular incident or accident, and we usually finish our argument

* Based on papers presented at the West Virginia State-wide Safety Conference, March 24, 1944, and the Greater New York Safety Convention, March 30, 1944.

by appealing to the inquirer's reason, common sense, etc., along some such lines as: "After all, ninety per cent of what we learn and do throughout our lives depends directly or indirectly upon vision. Therefore, visual skills and seeing conditions must play an overwhelmingly important rôle in the number and type of industrial accidents occurring."

The skeptic, however, is not satisfied with such generalities. He might ask, for example, "Just what per cent of industrial accidents are due in whole or in part, directly or indirectly, to poor visual acuity (keenness of vision), to lack of depth perception, to color-discrimination deficiency, to muscle imbalance, as these are measured for distance and near situations, to improper seeing conditions, *i. e.* quality and quantity of illumination?" Our answers to such questions can only be sketchy, incomplete, and qualified at present.

How We See

I should like to discuss separately the various component parts of the visual act and to point out some of their possible implications in the industrial field. It is hoped that such implications will suggest to safety engineers and supervisors the more obvious problems in vision and industrial safety, and also what part they themselves must play to help us find answers to these questions.

Visual acuity—or keenness or sharpness of vision—refers to the ability to perceive form, shape, configuration visually; and essentially, this depends upon the ability to distinguish two points as being separate. The variables industrially significant, which affect this function, are distance and age. Some individuals can see distant *and* near objects clearly; others can see only distant objects clearly, and still others can see only near objects clearly.

Vision Testing at Work Distances

For testing distance vision, a test chart with appropriate letters, numbers, or other symbols, is placed twenty feet from the subject, who has one eye covered at a time. In testing near visual acuity, a small reading card at sixteen to fourteen inches from the subject's eyes, is generally used. Both these testing situations are artificial in so far as workers are concerned; workers as a rule do not use either eye alone, nor only at the distances described. They usually

perform binocularly and at either varying distances or mostly at a relatively fixed working distance. Visual acuity, when measured in individuals selected at random as they apply for jobs, with or without glasses, may vary greatly at different distances. Therefore, it is often the case that the employer never finds out exactly how acute his employees' vision is for the distance at which these men are hired to work. For example, a prospective employee (who is fifty years of age) has a pair of glasses for reading, which means correction has been furnished for normal reading distance of fourteen to sixteen inches. His distance and reading visual acuity is then measured and recorded in each eye, singly; but the man is put on a job, the work distance of which is thirty to forty inches and which requires the use of both eyes simultaneously.

Industry's Responsibility in Vision Testing

Instances like this one, multiplied many times, yield results which, when lumped together, may distort any analysis of job performance, safety, and visual acuity. It is the responsibility of the professional services to provide correction lenses, prisms, exercises, etc., for the work distance; and to measure acuity specifically for the employee's particular job. But it is industry's responsibility to take this factor into account when conducting surveys and making analyses of safety and of visual acuity. It is also industry's responsibility to indicate the work distance in all reports of accidents as they occur, and if possible, the acuity at this distance, if it be available. Only when such data are obtainable can any reasonable deductions be made on a quantitative basis, regarding the possible relationship between accident frequency, or rate, accident repeaters, accident proneness, and visual acuity.

Age and Visual Acuity

It was stated previously that age, too, is a factor in visual acuity. This is so primarily because the ability to do close work diminishes with age—particularly after forty years. It is this limitation imposed by age, that makes it necessary to determine specifically, the acuity or keenness of vision of these older individuals at the particular work distance at which they are working. Just as

flexibility of other functions declines with age, so do visual skills—especially sharpness of vision. For this reason, it is advisable in industry to recheck at more frequent intervals the eyes of employees over forty years of age. This serves not only industry by correcting the vision of aging eyes so that they can continue on the job, but the aging employee, himself, through discovery of other findings, defects, and possible diseases.

To summarize, visual acuity should be measured under those conditions which will yield data that can be expected to correlate most accurately with job performance. That means that acuity at the work distance, using both eyes together, should be recorded and that this should be checked and rechecked at fairly frequent periods in employees over forty years of age. As you may well know, this has not been done in the past. It is well to keep this fact in mind when investigators point out to us that some particular analysis or study of visual acuity—as these are ordinarily measured—does not correlate significantly with either job performance or accident frequency. It may well be that such a correlation, when established along the rigid lines indicated, will not be very great. In fact, it might not even be present at all. However, there is no justification for any such conclusion until the data upon which we base this conclusion have been accurately obtained.

Depth Perception

The second visual skill that was mentioned was depth perception or stereopsis. There exists at present some disagreement as to the actual rôle this visual skill plays, either in job performance or accident rate. This is to be expected because of the following factors:

(1) Some relationship has been demonstrated by the type of work and activities that people ordinarily engage in and the amount of stereopsis found among them—that is, those who do flat work as a rule do not score as high on most tests for depth perception as do individuals who work in depth (those who work on moving equipment, doing assembly work, etc.).

(2) Depth perception has been found to vary with age, independent of the worker involved. Thus, it reaches a maximum between the ages of thirty and fifty; and is lower than this level below the age of thirty and over the age of fifty.

(3) There is also some evidence that depth perception can be developed to some degree by training. However, most tests to measure the ability of individuals to distinguish the distance of various objects in relation to one another, are extremely difficult to devise, administer, and interpret. Most industrial medical offices, where physical examinations are done, are not equipped with devices to measure depth qualitatively, let alone quantitatively.

The majority of American workers are hired without any attempt to determine whether or not they do see in three dimensions, and yet it would be very dangerous to assign a man who does not have the sense of depth appreciation which is needed to operate a crane or to run any mobile equipment, where split-second decisions as to position of objects have to be made. As was just pointed out, learning plays a big part in the carrying out of such operations. This factor makes it very difficult to evaluate the full importance and significance of depth perception in industry. Again, just as for visual acuity, before we shall be able to say what percentage of industrial accidents are due to faulty depth perception, we shall have to wait until depth perception is measured accurately, and in a large enough number of workers.

Color Discrimination

The third visual skill that I should like to consider is color discrimination. The implications of this aspect of visual skills, with respect to safety, seem more apparent than those in the two aspects previously considered—visual acuity and depth perception. We are all familiar with the various signal devices used for directing traffic and with the color schemes employed in wiring codes. It is obvious that an individual who is unable to distinguish red from green (green color blindness) is likely to misinterpret safety signals. Yet there are far too many instances where color vision tests are not conducted. One of the simplest things that can be done by a safety supervisor in any plant, which will yield profitable results in cutting down accidents, is to undertake a complete color vision survey of employees in the plant—all those engaged directly or indirectly with operations where colored signal devices are used. It is recommended, however, that a survey of this type should employ one of several approved tests. There are available for this purpose very

satisfactory color plates, which may be obtained from any one of the large optical companies in this country. Too often, so-called simplified tests are used. Because of deficiencies in their make-up, their use should definitely be discouraged when more adequate means are available.

In a study of some 7,000 subjects, red and green color discrimination was measured and plotted against age (from twenty to seventy years). The percentage of those passing the test declined markedly with age. I should again like to suggest that individuals over forty, engaged in processes where color discrimination is important, should be tested at frequent intervals.

Muscle Imbalance

The fourth aspect of visual skills, muscle imbalance, has been shown, in one study, to be of extreme significance. It was found that on the average, some nine per cent of serious accidents occurred among individuals who had faulty (that is, insufficient) convergence, and that only four per cent of individuals who had adequate convergence ability, suffered serious accidents in this same plant of several thousand workers.

By convergence is meant the ability of an individual to direct both eyes properly to the object viewed, so that the eyes are in proper alignment for the distance at which the object is located.

It is surprising again to learn how few are the industrial establishments which attempt to attain some measure of muscle balance. However, there is some justification for this oversight, inasmuch as the test of ocular muscle balance is a complicated and time-consuming process. Nevertheless, the remarkable study just mentioned in connection with the red-green color discrimination testing, should stimulate further surveys of this type.

I do hope that by this time it has become apparent that, in attempting to uncover the important relationship existing between vision and industry, the various visual factors have to be separately considered. It is not enough to determine the smallest letter or number that an employee is able to see at a twenty-foot distance. It is also highly important to know what his muscle balance is, what degree of depth perception he has, whether he has color dis-

crimination at his usual work distance—or better, at the distance involved when the accident occurred.

Speed of Vision

One other item, not previously mentioned, is the speed of vision —that is, how long an individual's eyes must be exposed to a particular object before he sees it. This is of very great importance when his machinery becomes more complex and speeded up, as it is in the war plants in our country today. When time is of the essence, the use of high-speed punch presses, drill presses, lathes, and rapidly moving assembly lines only emphasizes the importance of this factor. There is not available at present, however, a simple method of determining the speed of vision.

The so-called tachystoscope has been used in certain instances to measure the speed of vision; but it is not yet widely enough available, nor has its use been standardized to a point to justify using it in industry on a large scale.

Conclusion

In conclusion, then, it may be stated that those of us in industrial eye hygiene are not in a position as yet to state authoritatively just what percentage of this or that type of accident is due to any one or any combination of the various component visual skills, irrespective of other factors such as proper light, etc. There is good reason to assume, however, that this percentage may be high enough to justify carrying out projects in industry, in which these various skills will be carefully and accurately measured against accident type and frequency. We hope that we will then be able to learn the facts, and disseminate sufficient information so that the terrible toll of industrial catastrophies may be measurably cut down.

The Forum

THIS section is reserved for brief or informal papers, discussions, questions and answers, and occasional pertinent quotations from other publications. We offer to publish letters or excerpts of general interest, assuming no responsibility for the opinions expressed therein. Individual questions are turned over to consultants in the particular field. Every communication must contain the writer's name and address, but these are omitted on request.

Rehabilitation of the Uni-Ocular Patient*

Most patients, during their stay in Hospital after sustaining the loss of one eye, seem to be very little conscious of disability. But as soon as they begin to mix with their relatives and friends, they become accident-conscious and inclined to exaggerate their difficulties, the more so if there is delay in payment of what they consider adequate compensation.

It seems very desirable, therefore, that active steps should be taken as soon as possible to re-educate the disabled; and such re-education can commence within a day or two of the removal of the eye.

The following account of the arrangements made in this district is put forward to promote interest in this part of the problem of rehabilitation after injury, and may stimulate further experiment.

Other areas almost certainly have more cases with which to deal. So the general outline of treatment only is given, and this in very simple language.

By the co-operation of the Rehabilitation Department of the Royal Sussex County Hospital, patients who have had an eye removed at the Sussex Eye Hospital are sent over to the Department as soon as they are allowed up. But, the rehabilitation starts while the patient is still in bed, on the second or third day after operation. The patient is given knitting with a cotton reel and crochet hook. He usually finds it good fun, and soon becomes efficient.

On the fourth or fifth day, the training proper begins at the Rehabilitation Department. This Department is in the hands of a

* Reprinted with permission from *The British Journal of Ophthalmology*, October, 1943.

Specialist, with specially trained Sister and Nurses. Patients with all kinds of disability are treated in the Department.

The Sister and Nurses responsible for the training of the uni-ocular patients have been taught the physiology of uni-ocular perception of depth, as follows:

A. Extrinsic Factors* (1) Psychological (*a*) Aerial perspective. (*b*) Distribution of light and shade. (*c*) Overlapping of contours. (*d*) Geometric perspective. (*e*) Interpretation of size. (These can all be demonstrated by the choice of a good colored landscape painting). (2) Parallactic Displacement.

B. Adjustment Factors. (1) Effort of accommodation. (2) Measurement by "estimation."

They also know the patients' difficulties. (1) Psychological. (*a*) "Loss of sight in one eye means loss of half his vision." (*b*) "Strain on the remaining eye." (2) Physiological. (*a*) Loss of a small amount of field. (*b*) Loss of stereoscopic vision.

The notes for the guidance of the trainers are as follows. Some people have a "master eye," *i.e.*, one which they use more than the other, although both may have good vision. Such patients will have greater difficulty in adjusting to the uni-ocular state, if the master eye is put out of action.

Treatment. (1) Psychological. (*a*) Encouragement, because the loss of sight is not really great. He must not be allowed to think that he is blind. Therefore, mixing with patients with other disabilities is good for him. (*b*) Either one of paired organs is quite capable of taking on the functions of both without injury to itself, *e.g.*, right-handedness, or one kidney.

(2) Physiological (*a*) The loss of field is relatively small, and this difficulty can be overcome by a slight false torticollis, and by keeping known objects on the blind side, such as by walking next to the railings in the street. The patient can take exercise in walking to avoid objects and touch others *en route.* (*b*) The loss of perception of depth is very real, and constitutes the main difficulty to overcome. Explanation of the extrinsic factors which make for conception of depth should help the patient, especially for estimating distant objects. But for nearer things, for instance, the depth of a step up or down, "practice makes perfect."

The patient can do gymnastics, climbing up and down wall ladders, and stepping over objects on the floor. This helps to keep him fit in body, and, in company with other disabled persons, to take him out of himself.

To hasten the time when the patient can resume a remunerative occupation, hand-and-eye training is essential. The following exercises become progressively more difficult.

* *Duke-Elder.*—Text-Book of Ophthalmology, Vol. I.

"Knitting Nancy" (cotton reel knitting).
Peggity, or a similar game.
Sewing canvas.
Rawlplugs and screws.
Hammering nails.
Carpentry or other hand work.
Ping-pong.

Treatment is given daily, and the patients are purposely not taught things ordinarily done by the blind.

It has been found that the above treatment provides a stimulating and interesting mixture of work and play. It necessitates a slightly longer stay in Hospital, say ten days to a fortnight in all. But the patients go out in a much better frame of mind.

—C. G. SCHURR
Hove, England

Report of Discussion on Vision Testing Procedures

Screening programs for the discovery and follow-up of visual difficulties in preschool and school children were discussed at a meeting called by the National Society for the Prevention of Blindness in New York City on November 9, 1943. With Thomas H. Johnson, M.D., Chairman of the Society's Committee on Vision Testing Procedure, presiding, the group included ophthalmologists associated with school systems; administrators of school and public health and welfare services and of prevention of blindness agencies from four neighboring states; and several members of the staff of the U. S. Children's Bureau. Present development of screening programs and the principles and policies which should guide such programs were the topics considered.

Extent of Development of Screening Programs

Screening tests are far less commonly available to preschool children than to school children. Although frequently included in "school readiness" conferences, routine tests are rare in well-child conferences and nursery schools. Thus the number of preschool children whose vision is tested is quite limited, and the tests are usually delayed until children are four to six years of age. Most of the testing for this group is done by nurses, although in a few places volunteers are trained to render this service under the supervision of nurses.

Most elementary schools having a school health service test the children's vision annually. However, some give no tests to children below the third grade. In schools with no organized health service, routine testing is dependent upon the initiative of individual teachers or of local school administrators. While annual vision tests are continued through high school years in some systems, in others they are not given in grades beyond the elementary or junior high school. In the past most of the visual screening in schools has been done by nurses, but educators are coming increasingly to rec-

ognize the value of transferring this responsibility to the classroom teachers, the nurses serving as consultants and, if necessary, rechecking those whose vision is believed defective.

Methods of Testing

The test most used in screening is the Snellen, with consideration given also to observed signs of eye difficulties. In some places muscle balance and color vision are also tested, and in a few the Snellen test is supplemented by tests for hypermetropia (farsightedness).

Other tests discussed at the meeting were the Massachusetts Vision Test, the Rapid Visual Screening Test and the Telebinocular.

The Massachusetts Vision Test—The equipment for this test was exhibited and the tests discussed by Albert E. Sloane, M.D., who served as consultant ophthalmologist in its development, and Lura Oak, Ph.D., Director of Field Service in Child Growth and Development of the Division of Child Hygiene of the Massachusetts Department of Public Health, who has charge of the project. This battery of tests utilizes the Snellen test, (with controlled lighting) plus spheres for detecting hypermetropia, and Maddox rods for discovering latent muscle imbalance. Special equipment and a standardized procedure have been developed to require a minimum of training for those who give the tests.[1] Teachers, nurses, and technicians have used the tests satisfactorily after being trained by the technical staff of the Massachusetts Health Department.

The reliability of this battery has been measured by comparison with an ophthalmological examination of 248 children. From this it was found that the battery missed 2 per cent of the children whom the ophthalmologist considered to need care, and screened out 9 per cent whom the ophthalmologist found to need no treatment.[2] Considering the latter a desirable margin of overselectivity, Dr. Sloane stated that many of these were children with some slight visual difficulty for which the need of eye care could be determined only by a thorough examination and an appraisal of the needs of the individual child. Dr. Sloane further reported that 86 per cent of those failing the battery of tests were screened out on the basis of the Snellen test alone—the other 14 per cent passed the Snellen but failed either on the plus sphere or the Maddox rod tests.

The equipment and battery of tests have been approved by the Council on Physical Therapy of the American Medical Association as a suitable method of screening in schools.[3] Dr. Oak reported that it was proving equally valuable for screening preschool children as young as three years of age, and is being increasingly used in child health services as well as in both ele-

mentary and high schools throughout Massachusetts and elsewhere. The tests are given in a routine order and, to conserve time, are stopped at the first point of failure. Thus it takes about 5 minutes per child in the preschool group, and ranges down to 1 minute per child for those above the third grade.

Through the Field Service in Growth and Development, the State Health Department carries on a program for promoting the use of the battery and training testers. This, however, is in co-operation with local ophthalmologists, school and health authorities. They report that while the tests have been widely accepted, a few ophthalmologists do not approve the use of the plus spheres and Maddox rods in screening.

The Rapid Visual Screening Test—The equipment, reports and photographs of the procedure were displayed and discussed by James G. Morrissey, M.D., consultant ophthalmologist for schools of Yonkers, New York, who has developed this test. Emily A. Pratt, M.D., Supervisor for Eyes and Ears of the New York State Department of Education, supplemented this discussion.

This is a group test used for simultaneous testing of all the children in a classroom while they sit at their desks. As the tests are made at distances ranging from 12½ to 32½ feet from the charts, specially designed symbol E charts are used, drawn to a scale which approximates the Snellen sizes for comparable distances. If the last line read correctly at any particular distance is the one which at that distance approximates 20/20 or better of the standard Snellen chart the visual acuity is classed as "normal," while if this line cannot be read at this distance the visual acuity is considered "defective." All children whose vision is recorded as defective, on the basis of this test, receive an ophthalmological examination by Dr. Morrissey.

No controlled lighting is used. Charts are placed on the blackboard at about eye level of an adult when standing, one chart being used for each two rows of desks.

The children copy the symbols they can see, with each eye separately, then with both together. The unused eye is covered with a small card held by the child in the hand not used for writing. In photographs of this procedure some of the children did not seem to have the eye fully covered and there was some discussion as to whether one teacher could adequately supervise a classroom full of children taking this test. Dr. Morrissey and Dr. Pratt felt that the teacher would know which ones need watching.

All kindergarten children receive an ophthalmological examination by Dr. Morrissey, supplemented later by a modification of the group test described above. Treatment or glasses are recommended for 25 per

cent of all of the kindergarten children, and careful follow-up has reduced the number of defects found subsequently in the grades.

Emphasis was placed on the educational aspects of the program. The entire school participates and welfare agencies aid in the follow-up. Dr. Pratt reported the program is popular with school administrators and is being adopted in other communities in New York State where, however, the recheck is given by a teacher-nurse instead of the ophthalmological examination.

There were a number of questions about the reliability of the findings but figures did not seem to be available as to the number of missed cases because (except in the kindergarten group) only those whose vision is classed as defective receive an ophthalmological examination.

Telebinocular—This stereoscopic testing instrument was exhibited with the charts and record forms. Discussion brought out that it is popular with guidance and remedial reading departments, but that many schools discontinue its use after a brief trial. In 1938 the Council on Physical Therapy of the American Medical Association declared the charts unsuitable for school use[4] and at about the same time several studies appeared in ophthalmological literature indicating apparent inaccuracies in the findings as compared with ophthalmological examinations. The manufacturer reports that the charts and records have since been revised, but as far as known the revised material has not been evaluated by the American Medical Association. Nor have any more recent studies appeared in the ophthalmological literature. However, in 1943 the Joint Committee on Industrial Ophthalmology published a report on the instrument, charts, and records provided for industry by the same manufacturer. These are very similar to those used in schools. This report indicates difficulties similar to those found in the school tests and recommends that the industrial tests should be used only under the supervision of ophthalmologic or medical departments.[5]

Methods and Problems of Follow-Up

In well-child and "school readiness" conferences the parent is usually present at the time of the vision test and physical examination, and visual findings are discussed by the physician and nurse with the parent at this time. In subsequent conferences the nurse assists the family in planning necessary examinations and treatment.

In schools if an annual physical examination is given, the vision test usually precedes the examination and the findings are taken into consideration in the physician's appraisal of the child's health. Where parents attend the examination or subsequently come to the school for a conference, visual find-

ings are discussed with them by the physician, nurse, or both. In some schools the teacher is also present. However, more frequently a printed form is used to report suspected defects to the parents, and is usually given to the child to take home. This states that inspections or tests made at school indicate the need of an eye examination and recommend that the family physician be consulted. Although space is usually provided for a return report from the specialist, it is seldom used, and the school receives information on the findings of the specialist only in exceptional cases where a personal contact is made by the school physician or nurse.

When a child returns with glasses the nurse commonly rechecks and, if vision is still not normal, often contacts the specialist, but if other types of treatment are being used, the school personnel may be unaware of it.

The classification of visual defects varies from one school system to another and in many places evaluation of the seriousness of the suspected defect in each individual case is largely left to the judgment of the tester. Snellen findings and observed signs of eye difficulties are usually the chief basis for advising an eye examination and for determining the urgency. In some places parents are notified if a child has a visual acuity of less than 20/20; in others, only if lower than 20/30; in still others, only those having less than 20/40 are reported. Some schools use a "X, XX, XXX" classification. Under this system X denotes either minor signs of eye difficulty and a normal visual acuity, or a first finding of 20/30 with no observed evidence of difficulty. If the latter is true, teachers and, in some places, parents are asked to watch the children closely. Rechecks are sometimes made a few months later and if the visual acuity has not improved, the defect is then classed as XX. A visual acuity of 20/40 or 20/50 is also classified XX. Notices are sent to parents of all children thus classified. The XXX classification is reserved for those who have a visual acuity of 20/70 or less or have marked evidence of being in urgent need of care, and usually personal contact is sought with the parents.

A Screening Program Under Ophthalmological Guidance

Upon request, Inez Wilber, M.D., school ophthalmologist of Washington, D.C., outlined the program for preschool and school children under the Municipal Department of Health which conducts well-child conferences and provides the medical and nursing service for the schools. Two years ago Dr. Wilber was appointed full-time school ophthalmologist, a staff nurse was assigned to assist her, and she was given charge of an eye clinic to serve preschool and school children. Re-

cently a second nurse and a clerk have been added to the staff and a co-ordinating committee on school health has been appointed, with representatives from the departments of health and education. The entire eye program in schools and in preschool health department services is under the guidance of Dr. Wilber and her staff. Direct responsibility for carrying it through is, however, delegated to the nurse assigned to the particular school or preschool service, in co-operation with principals and teachers or with volunteers in preschool services.

Screening of preschool children was initiated several years ago in the well-child conferences through a co-operative program in which the District of Columbia Society for the Prevention of Blindness trained and supervised volunteers who gave the tests in the conferences, follow-up being done by physicians and nurses of the health department staff. The entire program has now been taken over by the health department which is also initiating screening tests in nursery schools.

Until this year vision testing in schools was limited to the first four grades, but it is now being extended to include the entire school population. Methods have been standardized, illuminated chart-units provided, and an educational program developed for nurses and teachers with demonstrations and mimeographed instructions on vision testing procedures. Special record forms used were displayed. Teachers are now making most of the tests with nurses as consultants, and organizing the work in each school with the aid of the principals. The tests are to be completed by December 1, 1943, and reports of the teachers' tests to be routed to the nurse through the office of the principal. The nurse will then recheck the children whose visual acuity is below a specified standard (20/40 up to third grade and 20/30 for all others). The information will be transferred to follow-up records and the original reports forwarded to Dr. Wilber.

Parents notified of suspected visual defects are asked to fill out a form indicating what they plan to do about it and the name of the specialist to whom they expect to take the child, or to indicate whether they need assistance in arranging for an eye examination. The nurse then gives the child a report for the specialist to fill out, or, if assistance is requested, arranges a conference with the family. Those unable to pay for private care are referred to the school eye clinic. When specialists' reports are returned the information is transferred to the child's health record and the reports are forwarded to Dr. Wilber. Nurses also receive reports from the school eye clinic for children referred there.

Discussion brought out that while ophthalmological guidance is available in the school systems of many large cities, it is seldom as compre-

hensive as that described here, and is totally lacking in smaller cities and in most rural areas. New York is the only state which has an ophthalmologist on the staff of the department of education. Twenty states have sight conservation committees of ophthalmologists who might assist in the development of policies and programs for vision testing.

Principles and Policies

Several of the ophthalmologists present stated, and all seemed to concur, that the goal for all eye health programs for children should be an ophthalmological examination for every child before school entrance, with such re-examinations as are needed. Screening tests should be viewed as a necessary adjunct to, but not a substitute for, such examinations. Early discovery of visual difficulties is an important factor in securing best results. Latent muscle imbalance and conditions likely to contribute to muscle imbalance or strabismus are often not discovered without an examination or screening tests. Since early treatment of these conditions offers the best hopes of bringing the whole integrated act of seeing to normal, routine screening should start as early in the preschool years as possible. This also permits the child to become oriented to glasses before school entrance if these are needed. Routine screening in school should start as soon as the child enters school and should continue annually throughout his school life. In the upper grades and in high school the findings should be taken into consideration in guidance programs.

Evaluation of screening tests should be based on a comparison of the findings for each person tested with those of an ophthalmological examination. While there should be a high degree of correlation between test findings and the ophthalmological examination, the screening tests should select some with borderline conditions whose need of treatment can only be determined by a thorough eye examination. Thus screening tests should give a margin of "over-referral." For best results screening tests should be adaptations of those commonly employed by eye specialists, suitable for use by testers who have a minimum of training, hold the interest and be within the capacity of the individuals to be tested.

It was agreed that in determining the need of an eye examination, tests should be supplemented by observation of signs and symptoms of eye difficulty, the continued presence of which should take precedence over test-findings in deciding both the need of such an examination and its urgency. There was considerable stress on the importance of such observations by teachers who are in daily contact with the children. However, as the value of observations is in direct proportion to the capacity of individual

observers, all who are responsible for the care of children need training in recognizing and reporting the signs of eye difficulties.

Although the Snellen test, when properly made, was considered the most important single test in screening out those who have visual defects, it measures only the visual acuity. It should therefore be supplemented by observations and by tests designed to detect other significant conditions.

Vision tests of small children are often less accurate than those for older children. This should be taken into consideration in recommending an eye examination on the basis of the Snellen test findings. Hence it was recommended that, unless other signs of eye difficulty are noted, examination need not be advised for children under the third grade who have a visual acuity of 20/30 especially on the first test, but should be for all who have 20/40 or less. However, an eye examination should be planned for all children in the third grade or above who have a visual acuity of 20/30 or less, even if there are no observable signs of difficulty. Prompt and careful attention should be given to those with a markedly reduced visual acuity and to those whose visual acuity shows a change, especially a decrease, however slight.

Closer co-operation between eye specialists and preschool and school health services was considered to be urgently needed. This should include the development of satisfactory routine methods of exchanging information concerning the problems of individual children and increased responsibility on the part of the specialists for interpreting eye problems and policies of the referring agency in recommending examination. Ophthalmologists should guide the programs, helping agencies to standardize procedures and policies and to develop adequate educational programs.

More careful consideration was recommended in the selection and preparation of testers. Delegation of this responsibility to the classroom teacher assures the test being given by a person familiar with the child, and offers the best possibility for correlating the test-findings with daily observations and for utilizing the test as an integral part of the child's health education. Nurses, however, should give consultant services to the teachers, explain to parents the need of examination and inform them of resources and interpret the doctor's findings and recommendations to both parents and teachers. Preparation for these duties should be a fundamental part of the education of both groups and should be followed by an in-service educational program under ophthalmological guidance.

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ELEANOR W. MUMFORD, R.N.

Sore Eyes May Mean Trachoma*

Trachoma is one of the diseases sometimes called "granulated eyelids" or "red sore eyes." It is an inflammation of the lining of the eyelids and the eyeball. The disease is infectious or "catching."

The early signs are watering, itching and burning, or a feeling as if there were something in the eye. Light causes pain in the eyes and the tears flow excessively. The feeling of something in the eye is so marked that many trachoma patients tell the doctor that the trouble was caused by getting dust or sand in the eyes.

Trachoma Is Widespread

Historic records indicate that trachoma was known in ancient times. It has spread from Egypt to all parts of the world. In the United States it is seen occasionally in all sections. It is very prevalent in an area west from West Virginia, through Kentucky, Tennessee, Missouri, Arkansas, Oklahoma and Kansas, and among the American Indians.

Blindness Can Be Prevented

Nobody dies from trachoma, and for that reason not many people become alarmed about it, but it is deserving of serious consideration because the damage to vision causes a great amount of suffering and loss of earning power. If not treated, the eye becomes more and more inflamed, until the cornea, or clear front of the eyeball, becomes clouded by blood vessels growing into it. In time, scars form on the inside of the lid, and when these scars con-

* Reprinted with permission of the Trachoma Control Service, Arkansas State Board of Health (Tr. Folder No. 1—1944). Suggestions from U. S. Public Health Service, National Society for the Prevention of Blindness, and the Metropolitan Life Insurance Company.

tract, or "draw," as all scars do, the edge of the lid is pulled inward, causing the lashes to scratch the eyeball. This is very painful and adds to the cloudiness of the eye. Partial or complete blindness may result, but fortunately this need not and will not happen if the person showing signs of the disease will put himself under the care of a doctor.

Treatment Is Not Painful

The present treatment is not painful as in the olden days. It consists of sulfanilamide given in tablet form, by mouth, in small doses. This treatment should be taken under supervision of a physician who can determine the proper dosage. The local treatment consists of drops of sulfanilamide solution and cleanliness. When the doctor's directions are followed carefully there are no serious reactions to this treatment. Some nausea and dizziness may be noticed, but if treatment is continued the results are worth this slight discomfort. Treatment should be started as early as possible. It seldom becomes necessary to operate on the eyelids unless the disease is so far advanced before treatment that lashes have turned inward.

Trachoma Is "Catching"

Trachoma is spread from one person to another by getting the infective material from the eye of a person having trachoma into the eye of another person. This may happen by using the same towel, wash basin, handkerchief, and other articles. It is not safe to sleep in the bed with a person who has trachoma. Trachoma does not produce immunity, like chicken pox and some other diseases. For this reason a person may be cured and then "catch" trachoma again. It is important that all cases in a family be treated.

It is of the greatest importance to prevent the spread of the disease. The following suggestions to trachoma victims will help someone else from becoming blind:

1. Place yourself under treatment by a reputable physician without delay, an eye physician, if possible. Continue treatment until the physician dismisses you.

2. If the doctor says you have trachoma, *have all members of your family examined. You would not want them to blame you if they became blind from trachoma.* Never let anyone use medicine or drops given to someone else.

3. Keep your face clean, especially about the eyes. Wash your hands before and after touching your eyes.

4. Have clean handkerchiefs or clean cloths to wipe your eyes. See that they are boiled or burned after use.

5. Do not leave your towel, soap, or wash basin where other persons can use them, for they may also get trachoma.

6. Babies may catch trachoma, so be careful in cleaning the baby's face. Use wash cloths that have been boiled, and wash your hands before bathing the baby or touching his eyelids.

7. *Glasses Will Not Cure Trachoma.* Do not let anyone sell you glasses in the hope that they will cure you.

—K. W. COSGROVE, M.D.
Little Rock, Ark.

Editorial

Dear Subscribers and Friends!

WE have a lot of explaining to do. Readers must be asking all sorts of questions. First of all: "Where are our SIGHT-SAVING REVIEWS?" Second, "What are you going to do about it?" and third, "What is the idea of sending us an issue bound in blue?"

We shall begin by answering the last question first. The War has deprived us of the possibility of obtaining more paper of the usual color, and we have been offered instead a variety of less interesting colors from which to choose; we thought the blue might be a welcome change, and an advance color proof seemed promising to us. We hope you like it.

Now, about the past issues of the REVIEW—Volume XIII lacks the last issue. This will be sent you, in its old jacket, as a Supplement devoted to the subject of Industrial Ophthalmology, based on talks given by specialists at a Seminar conducted under the auspices of the National Society for the Prevention of Blindness. The Index for Volume XIII will not be bound in the Supplement but will be sent separately. There will be no Spring, 1944 issue of Volume XIV the REVIEW, but you may be sure there will be four issues for the volume, even though we are starting with this, the Summer number. These delays, as we have told you in the past, are due to added pressure of work directly related to the war effort, coupled with personnel shortages. These hardships have been felt keenly too by many of our loyal friends and co-workers upon whom we used to count for articles and book reviews, and we have found it difficult to get the kind of material we feel would be most useful to our readers.

May we therefore call upon you and beg your indulgence with us during these difficult times? We shall be glad to receive suggestions, manuscripts, book reviews, and notes that any of you may care to submit. Let us know what types of articles you would like to read. Help us make the REVIEW the kind of magazine that will be of the greatest service to you.

Note and Comment

Linda Neville to get Leslie Dana Medal.—The Leslie Dana Gold Medal, awarded annually for outstanding achievements in the prevention of blindness and the conservation of vision, will be presented this year to Miss Linda Neville of Lexington, Ky.

Miss Neville who needs no introduction to workers in sight conservation is the founder of the Kentucky Society for the Prevention of Blindness which is virtually a one-woman organization, and she is known in her home state as "the angel of Kentucky." During the past 40 years, she has utilized her Bryn Mawr education, taken advantage of her social connections and spent practically her entire inheritance in order to bring sight to hundreds of babies, young children, and adults, from the poverty-stricken mountain districts of Kentucky, who needed medical care or eye surgery.

Miss Neville, who is now 70 years old, was born in the same house which has served as the headquarters for her prevention of blindness activities. At least 1,000 persons have received skilled medical care and have been saved from the doom of darkness through her intercession.

Selection of the recipient of the Leslie Dana Gold Medal is made by the St. Louis Society for the Blind, through which the medal is offered by Mr. Leslie Dana of St. Louis. This highly prized token of recognition in the field of public health is given upon the recommendation of the Association for Research in Ophthalmology.

The conditions of the Leslie Dana Medal award set forth that it is to be made for "long meritorious service in the conservation of vision; in the prevention and cure of diseases dangerous to eyesight; research and instruction in ophthalmology and allied subjects; social service for the control of eye diseases; and special discoveries in the domain of general science or medicine of exceptional importance in conservation of vision."

National Health Council Election.—Readers of the REVIEW will be pleased to hear of the election of Mrs. Eleanor Brown Merrill,

Executive Director of the National Society for the Prevention of Blindness, as President of the National Health Council, for 1944. She is the first woman to be elected president since the founding of the Council in 1921. Mrs. Merrill succeeds Dr. George S. Stevenson, Medical Director of the National Committee for Mental Hygiene.

Other officers are: Vice-President, Dr. Walter Clarke, Executive Director of the American Social Hygiene Association, who succeeds Dr. Kendall Emerson, Managing Director of the National Tuberculosis Association; Secretary, Professor Maurice A. Bigelow, President of the American Eugenics Society; Treasurer, Dr. William F. Snow, General Director of the American Social Hygiene Association. Dr. G. Foard McGinnis, Director of Medical and Health Services, American Red Cross, was elected to the Board of Directors.

The National Health Council, with headquarters at 1790 Broadway, New York City, is a clearing house of 20 voluntary health organizations. As one of its activities, the Council maintains a library whose facilities are used by research workers from all parts of the United States and, particularly, by students of medicine, nursing and public health from local and nearby colleges and universities.

The National Health Library contains more than 6,000 volumes and 30,000 pamphlets dealing with public health, sanitation, and related subjects; more than 500 professional journals and technical periodicals are received regularly from all parts of the world. As an aid to public libraries in the selection of books on health subjects, an annual guide is prepared for publication in the Book List of the American Library Association; in addition, the library issues its own weekly bulletin, giving brief digests of current magazine articles pertaining to health matters.

Active member agencies in the National Health Council include the following: American Eugenics Society, American Heart Association, American Public Health Association, American Red Cross, American Social Hygiene Association, American Society for the Control of Cancer, American Society for the Hard of Hearing, Conference of State and Provincial Health Authorities of North America, Maternity Center Association, National Committee of Health Council Executives, National Committee for Mental Hy-

giene, National Organization for Public Health Nursing, National Society for the Prevention of Blindness and the National Tuberculosis Association.

Associate member agencies are: American Association of Medical Social Workers, American Diabetes Association, American Nurses' Association, Foundation for Positive Health, Laymen's League Against Epilepsy and the Planned Parenthood Federation of America.

The U. S. Public Health Service and the U. S. Children's Bureau are advisory members.

Seminar in Industrial Ophthalmology.—The Society's staff, in co-operation with leading opthalmologists, this Spring held a very successful Seminar in Industrial Ophthalmology, consisting of five weekly sessions. It is hoped that through the co-operation of a number of Federal agencies, the need for an adequate eye conservation program will be brought to the attention of the management of some 30,000 industrial plants. The Seminar was designed to help meet the need for additional industrial ophthalmologists, which is expected to result from this project.

The joint Committee on Industrial Ophthalmology of the American Medical Association and the American Academy of Ophthalmology and Otolaryngology co-operated in preparing the Seminar. Lecturers for the meetings included leading ophthalmologists as well as industrial and illuminating engineers of outstanding repute, and approximately 60 ophthalmologists registered. The five subjects covered were: (1) Survey of Eye Conditions in Industry and of Industrial Eye Hazards; (2) Visual Examination, Refraction and Prescription for Industrial Working Conditions; (3) Illumination for Industry; (4) First Aid and Industrial Nursing; (5)*a*. Establishing an Industrial Eye Conservation Program; *b*. Governmental and Voluntary Health Agencies in the Industrial Eye Field; *c*. Compensation Laws as They Affect Ophthalmologists.

An Eye Bank.—Prevention of blindness has taken another step in its advancement in the establishment of an "eye bank" for the storage of human corneas, at New York Hospital under the joint auspices of that institution and Manhattan Eye, Ear and Throat

Hospital. Heretofore a dearth of eye tissue for transplantation has denied the benefit of this procedure to some whose vision could have been restored thereby. With the development of methods for preserving such tissue, a "bank" to make corneas available on need became a logical undertaking.

Nineteen hospitals in the Metropolitan Area are co-operating with the two above-named hospitals in this project. For the present, eyes can be accepted only from patients in these participating institutions. The eyes can be obtained either from living persons who have lost the sight of one or both eyes, provided the corneas are healthy; or from individuals who arrange to have their eyes removed immediately after death.

We think it is important to call attention to the fact that this wonderful operation—corneal transplantation—can restore the sight of only a small proportion of the 200,000 blind in the United States. Unfortunately, much disappointment and heartache have resulted, in the past, from publicity regarding such operations; the families of many blind persons do not understand that this operation is only for those blind from corneal opacities.

Summer Courses for the Preparation of Teachers and Supervisors of Sight-Saving Classes.—Three courses for the preparation of teachers and supervisors of sight-saving classes were offered during the summer session of 1944. Because of the difficulties of transportation, these were arranged to meet the needs of supervisors, teachers, nurses, welfare workers and others in the far west, the middle west, and the east. All three courses met standard requirements and offered graduate and undergraduate credits. They were held at the University of California, Los Angeles, Calif.; Michigan State Normal College, Ypsilanti, Michigan; and Teachers College, Columbia University, New York, N. Y.

American Board of Ophthalmology Moves its Office.—The Executive Office of the Board has moved to the American Board of Ophthalmology, Cape Cottage, Maine. The third edition of the *Directory of Medical Specialists* listing names and biographic data of all persons certified by the fifteen American Boards is to be

published early in 1945. Collection of biographic data of the diplomates certified since the 1942 edition, and revision of the older listings in that volume are now going forward rapidly. Diplomates are requested to make prompt return of their notices regarding their biographies as soon as possible after receiving the proper forms from the publication office to be mailed to them.

Prevention of Blindness in Bengal.—We have received the 13th Annual Report of the Association for the Prevention of Blindness, Bengal, which was founded in 1930 through the stimulation of Mr. and Mrs. Rufus Graves Mather, the latter being the founder secretary of the New York Association for the Blind. The four purposes of the Association outlined in December of that year at a convention of ophthalmic surgeons, were education, establishment of travelling eye dispensaries, legislation, and training in ophthalmology. Public education for the Association is handled in all ways —lectures, films, publications, posters.

It is estimated that there are a million and a half blind persons in India, and three times that number partially so. Trachoma is listed as one of the chief causes, and a proposal is before the Indian Research Fund Association for a grant to implement research in this disease.

The Report contains several appendices including financial statements and minutes of the Association and its adjuncts, lists of schools where lectures and demonstrations have been given, and reports on the five travelling eye dispensaries and on the eye examination and lecture unit.

New Sight Conservation Motion Picture Makes an Impression.—Eleven state departments of health and of public welfare and 17 state colleges and universities have requested preview of the Society's new sound film, Eyes For Tomorrow, and 23 prints of the film have already been sold, since its release March 1.

Just a reminder: the price of the film is $50.00, complete with reel, metal can, and shipping case. It may be rented for $5.00 per showing day or $25.00 a week, exclusive of time in transit.

Spanish and Portuguese versions of the film are also being released at an early date by the Office of the Coordinator of Inter-

American Affairs; and it is of interest to report that inquiry has been received regarding the possibility of obtaining a Chinese version, for use in China.

British "Back to Work" Exhibition.—Last February saw the formal opening of an exhibition dealing with employment of the handicapped, organized by the Ministries of Labour and National Service, and of Information; St. Dunstan's and the National Institute for the Blind.

The Rt. Hon. Ernest Bevin, Minister of Labour and National Service, in his opening speech, gave voice to the organizers' desire that the Exhibition be looked at objectively: that disabilities, more frequent during war than otherwise, be dealt with on a basis as nearly equal to the normal as possible; and that it be remembered that the disabled can form productive atoms of the national economy if intelligently utilized.

The three main causes of disability—industry, war, and congenital handicaps—and two aspects of after treatment—vocational training and co-operation with voluntary agencies—are presented at the Exhibition.

New Edition of Sight Conservation Catalogue.—The Society has just published a new edition of its Publication 32, "Catalogue of Publications." This brings up to date the list of materials published and distributed by the Society, and includes also a listing of Vision Testing Charts, Posters, and Films. Single copies will be sent upon request to readers of the REVIEW.

Knudsen Award Goes to Dr. Vonachen.—On May 11 the Knudsen Award of the American Association of Industrial Physicians and Surgeons was presented to Dr. Harold A. Vonachen, medical director of the Caterpillar Tractor Company, Peoria, Illinois, for initiating and developing a plan to fit disabled workers to jobs and jobs to disabled workers, started in his own plant two years ago and developed through close co-operation with the medical personnel, safety division, and training and manufacturing department. When the success of the plan at the Caterpillar plant was assured, it was carried to the community, where 17 community organiza-

tions are represented on the executive committee of what has become the Peoria Plan for human rehabilitation.

Encouraging the Use of Protective Goggles.—The National Society for the Prevention of Blindness is anxious to advance its industrial eye safety and utilization program. With this in mind, it is asking readers of the REVIEW to give it the benefit of their experiences in regard to the use of protective goggles. A brief note or description of any methods or devices which have been found helpful in promoting the wearing of protective goggles will be greatly appreciated. This first-hand information will be summarized and passed on to those wishing the benefit of accumulated experiences.

Postwar Jobs in Vocational Rehabilitation.—Returning soldiers, ex-war workers, students, teachers, parents, counselors, and others who want to know about professional opportunities in helping injured persons to reestablish themselves economically, will want to read the composite summary of available literature on "Vocational Rehabilitation as a Career" just completed by Sarah Allen Beard and published by Occupational Index, Inc., New York University, New York 3, N. Y.

Sight Conservation Broadcasts.—Public health education concerning the danger of eye accidents in industry and the possibility of preventing blindness from glaucoma through early diagnosis and treatment is being brought to the American public through two 15-minute radio programs, produced for the Society by the Radio-Recording Division of the National Broadcasting Company. Electrical transcriptions of these dramatizations, entitled, "The Ultimate Victory is in Sight" and "A Stitch in Time," have been broadcast, to date, by 80 local stations in 37 states and the District of Columbia. Many additional stations are expected to schedule these programs within the next few months.

National Conference of Social Work.—The Society was represented at this year's National Social Work Conference in Cleveland, by Mrs. Merrill; C. Edith Kerby, associate in program

planning and research; and Virginia Smith, staff associate. At the Society's special meeting, presided over by Miss Ruth B. McCoy, Assistant Director, Bureau of Services for the Blind, New York State Department of Social Welfare, Mrs. Merrill gave a paper on the subject, "Prevention of Blindness on the Home Front"—a progress report on prevention of blindness activities in the United States during the past ten years. This paper appears as the first article in this issue of the REVIEW.

Prevention of Blindness Institute Founded in Uruguay.—Through Dr. A. Vasquez-Barriere of Uruguay has come word that the National Institute for the Prevention of Blindness has been founded, with headquarters in Montevideo. The Society has furnished the Institute with material, and is being consulted regarding training of personnel for the new organization.

British Medical Industrial Service.—Great Britain has organized an industrial medical service to cover all plants. Under the auspices of the United States Government, Dr. W. E. Chiesman, representing the Industrial Medical Officers Association of London, is travelling extensively over this country to study industrial medical practices and methods. Since eyesight conservation is one of England's serious industrial problems, it is one of Dr. Chiesman's chief concerns, and the Society has facilitated his study by conferences and by giving him letters of introduction to safety and medical directors of divers industrial plants, to government and state medical officials, and to practicing ophthalmologists who are leaders in the field of industrial ophthalmology.

Glaucoma Exhibit.—The Society's Committee on Glaucoma (Chairman, Mark J. Schoenberg, M.D.) was fortunate in obtaining the valuable co-operation of other ophthalmologists in presenting an extensive exhibit covering the various aspects of the glaucoma problem, for the annual meeting of the New York State Medical Society, in May. Material was organized under the following headings: pathology, gonioscopy, scotometry, perimetry, pupillography, geographic distribution of glaucoma, special glaucoma clinics and services, the general practitioner's part, tonometer checking charts,

and the industrial aspects of glaucoma. It is expected that this same exhibit, with some supplementary material will be displayed at the forthcoming meeting of the American Academy of Ophthalmology and Otolaryngology, in Chicago, early in October.

Newsletter on Ophthalmology for Overseas.—International exchange of scientific advances has of course been interrupted by the war. To keep fellow-Americans and scientists of other nations informed as to progress in this country, the Division of Ophthalmology, University of California Medical School, has inaugurated a newsletter, which it expects to issue monthly. Contents of the first issue are abstracts of five papers from American ophthalmological publications, and future issues will follow the same pattern.

"Metal Locator" for Eye Saving.—The first operation on a human eye with the aid of the "metal locator," which helped save many lives at Pearl Harbor, has been reported at the Mt. Sinai Hospital in New York City. The device, invented by Samuel Berman, New York subway engineer, was used after Pearl Harbor for finding bullets and shrapnel in the bodies of the wounded, but Mt. Sinai is the first to use it for so delicate a task as finding a steel splinter about one-eighth of an inch long within the eyeball, near the retina.

The particle had been localized by x-ray. After a surgeon had exposed the back of the eyeball, the tip of the locator probe was run over it. As the metal point was moved close to the location of the steel splinter, the hand of a sensitive ammeter on the apparatus was deflected. The point at which the maximum deflection occurred was the spot directly over the splinter. Incision was then made and the splinter extracted with an electromagnet.

Penicillin in Ophthalmology.—The dramatic eye-saving rôle of penicillin in war is reported to the *British Medical Journal* by Dr. G. T. Willoughby Cashell, squadron leader and ophthalmic specialist, RAF. He states that eyes are saved which would otherwise certainly have been lost through intra-ocular infection. Cases of acute conjunctivitis improved dramatically, and even instances of long-standing discharge or inflamed lids are cured within weeks. In five

out of six cases of ulcers of the cornea and infections following perforating injury, spread of the infection to all structures and tissues of the eyes was avoided.

It is of interest to note also that in the United States, twenty million units of penicillin have been made available to the Illinois State Department of Public Health by the National Research Council to use on a research basis for the treatment of newborn babies with ophthalmia. Although the silver nitrate law for the protection of babies' eyes has made ophthalmia rare in Illinois, about 30 newborn infants are hospitalized at state expense each year to prevent blindness from a type of ophthalmia that is contracted at birth from mothers infected with a veneral disease, the state health department reported. The 20 million units of penicillin which have been made available to the department is enough to treat 30 infants, it was stated.

New Journal to be Published.—The British Medical Society announces the publication, begining January, 1945, of the *British Journal of Industrial Medicine.* It is intended that this will serve as an outlet for an expanding body of research into economic, physiological, psychological, and safety problems facing management, workers, and industrial physicians.

Dr. Donald Hunter of the London Hospital is proposed as editor-in-chief, with an editorial board comprised of Drs. A. J. Amor, M. W. Goldblatt, D. C. Norris, Donald Stewart and Mr. R. W. Watson-Jones, a surgeon.

The Mexico Association for the Prevention of Blindness.—Volume I (1943) of the *Archivos de la Asociacion para Evitar la Ceguera en Mexico* (Gomez Farias No. 19, Mexico D.F.)celebrates the twenty-fifth anniversary of the Association, whose Director is Dr. L. Sanchez Bulnes. Its history and achievements are recounted by Drs. Gustavo Baz, Cesar R. Margain, and Daniel and Fernando Silva. The volume contains also articles on ophthalmologic subjects.

Volume II (1944), continuing this policy, includes several articles by doctors of the U.S.A.—Drs. William Thornwall Davis, John N. Evans, Ramôn Castroviejo, Daniel B. Kirby, Martin I. Green,

Marc Amsler, Ray K. Daily, Arthur J. Bedell. Volume II carries English summaries of many articles.

Sight-Saving Class in Australia.—The Royal Victorian Institute for the Blind of Melbourne, Australia, gives aid to the classes for partially seeing children. We quote from the 1943 Annual Report of the Institute: "In its special class for myopic and partially-sighted children, the Education Department continues to use our books in large-sized print. We also placed at its disposal a special large-type typewriter which enabled stencils to be cut for the production of books for their classes. As it was found almost impossible to import large-type books, the typewriter has more than proved its worth."

Dr. Sawyer Appointed to UNRRA.—Dr. Wilbur A. Sawyer of New York has been appointed Director of Health of the United Nations Relief and Rehabilitation Administration. He has been assigned to Washington and will be in charge of the Health Division of UNRRA and be responsible for planning and directing health and medical activities. His duties will require frequent visits abroad to the regional offices, and field work.

Dr. Sawyer has had long experience in international health activities through his connection with the Rockefeller Foundation's International Health Division, of which he has been Director for the past nine years. Before the First World War, in which he served as Major in the Medical Corps of the Army, he held positions in California as Director of the State Hygienic Laboratory, Secretary and Executive Officer of the State Board of Health, and Clinical Professor of Hygiene and Preventive Medicine in the University of California. During the present war, Dr. Sawyer has served as member of the Subcommittee on Tropical Diseases under the Board of the Investigation of Epidemic Diseases in the Army, and as Honorary Consultant to the Medical Department of the Navy.

Wins Prize for Glaucoma Paper.—The Moura Brazil Prize for 1943 was won by Dr. Sylvio de Abreu Fialho of Rio de Janeiro with a paper on "Contribution to the Problem of the Diagnosis of Early Glaucoma."

Oxford Ophthalmological Congress.—Despite the distractions and difficulties occasioned by the War, the Oxford Ophthalmological Congress held its 30th Annual Meeting on July 6 and 7 at Oxford University. The Doyne Memorial Lecture was delivered by Professor Geoffrey Jefferson.

Charles H. May, M.D., 1861-1943.—Workers in prevention of blindness have lost a true friend in the death of Dr. Charles H. May. Though not all may have had the privilege of knowing him personally, they have received his invaluable assistance through their constant use of his book, *Manual of the Diseases of the Eye.* Writing in the *Archives of Ophthalmology,* of Dr. May's authorship of the book, Dr. Charles A. Perera, who knew him intimately as a close associate, and in later years, as assistant in preparing the book, says:

"In the field of medical writing Dr. May was a master. His most widely known work is his *Manual of the Diseases of the Eye,* which has gone through eighteen editions since 1900. . . . This book is in wide use as a textbook for medical students and general practitioners of medicine, and it has been translated into many foreign languages, the most recent one being the Portuguese. To Dr. May his textbook was a real child. He read the ophthalmologic literature assiduously, ever seeking to keep his book up-to-date. Just two weeks before his death, he insisted on completing the corrections of proof of the eighteenth edition of his brain child. . . .

"In handling patients he was without a peer. He knew when to reassure, when to be sympathetic and when to be firm. Patients with a hopeless prognosis were given a feeling of courage by his words.

"Like all great men, his kind and generous deeds were hidden. No one who sought his help was turned away."

The loss of Dr. May as an ophthalmologist, as a teacher, as a humane and generous person is irreparable, but some comfort and consolation can be sustained in the thought that his works go on, and his written word and teaching will continue to serve all those who are striving to conserve vision and prevent blindness.

Current Articles of Interest

Moto-Kinaesthetic Speech Training Applied to Visually Handicapped Children, Sara Stinchfield-Hawk, Ph.D. *Outlook for the Blind*, January, 1944, published monthly by the American Foundation for the Blind, Inc., 15 West 16th Street, New York 11, N. Y.

Premising that there is a larger percentage of speech defects among visually handicapped children and that prognosis is less favorable than among an unselected group, Dr. Stinchfield-Hawk proceeds to indicate the effectiveness of moto-kinaesthetic speech training among the partially seeing. Kinaesthesis operates in two ways: children can feel with their own hands the movements of the teacher's speech musculature as she talks; and they can learn by feeling, the shape, size and texture of objects.

Treatment of speech defects by this method will do much to effect the mental catharsis which adjusts the visually handicapped as poised, self-reliant members of society.

The Basis of Night Vision, G. L. Walls. *Illuminating Engineering*, February, 1944, published monthly by the Illuminating Engineering Society, 51 Madison Avenue, New York 10, N. Y.

Mr. Walls minutely describes the physiological process of dark adaptation, whose threshold, speed and final effectiveness vary greatly among individuals.

The causes of ineffective adaptation — principally vitamin-A deficiency or inadequate vitamin utilization—are discussed, as well as methods of lowering the threshold of adaptation—overventilation (rapid breathing) or breathing air of higher-than-ordinary oxygen content, which produce only momentary response; dietary manipulation; application of mild stimuli to other sense organs; and use of red goggles.

Mr. Walls briefly summarizes scientific opinion as to the relationship between pigmentation and the dark-adaptation threshold, and as to optimum outdoor illumination under blackout conditions.

Protect Young Eyes, H. Wallace Lane. *Hygeia*, April, 1944, published monthly by the American Medical Association, 535 N. Dearborn Street, Chicago 10, Ill.

Parents are again warned of the insidious onset of amblyopia—loss of vision in one eye. This occurs when, the eyes not focussing naturally together, the child finally gives up the effort of forcing them to look at a single object, and simply sees with one eye until the other weakens from disuse.

Tendency toward amblyopia is hereditary, but its development can be avoided by watchfulness and treatment during the preschool years. Lack of vigilance and carelessness about securing treatment will throughout life limit the amblyope's recreation and choice of vocation.

Newer Concepts of Eyestrain, Edgar E. Poos, M.D., F.A.C.S. *Eye, Ear, Nose and Throat Monthly*, March, 1944, published monthly by The Professional Press, Inc., 5 N. Wabash Avenue, Chicago 2, Ill.

Dr. Poos states that eyestrain is a very prevalent symptom which often is a reflection of the patient's general condition. Diagnosis depends upon the history, and therapy includes correction of visual errors, exercises and attention to the patient's general health.

Partially Seeing Children, Winifred Hathaway. Part III of A Decade of Progress in Special Education. *Journal of Exceptional Children*, May, 1944, published monthly during the school year by the International Council for Exceptional Children, Saranac, Michigan.

Although a decade is an exceedingly short period in the life of an educational movement, a foundation has been laid for the care of partially seeing children. Comparative figures regarding sight-saving classes at the beginning, and at the end, of the last decade, are cited: Number of classes, 428 to 629; locales, 127 cities in 23 states, to 221 cities in 31 states or territories; children accommodated, 7,000 to 9,000.

Mrs. Hathaway reports encouraging progress in educational procedure and attitudes; physical plants; legislation; medical pro-

vision; and special contributions in procedure or teacher-training, which point the way for even greater progress in decades to come.

Certain Virus Diseases of the Eye, S. Hanford McKee, M.D., F.R.C.S. (C). *The Canadian Medical Association Journal,* March, 1944, published monthly by The Canadian Medical Association, 3640 University Street, Montreal, Quebec.

The distinguishing properties of viruses are, that they are parasites unable to multiply apart from living cells; they are able to pass filters which retain all ordinary bacteria; and most of them produce inclusion bodies in susceptible cells. A number of the viruses are of ocular importance, and Dr. McKee discusses in detail the etiology and treatment of lesions of eye diseases caused by viruses, principally trachoma and kerato-conjunctivitis. (Inclusion conjunctivitis.)

Riboflavin and Vitamin A in Relation to "Eyestrain," Lionel Bradley Peet, Ph.D., M.D. *The Canadian Medical Association Journal,* October, 1943, published monthly by The Canadian Medical Association, 3640 University Street, Montreal, Quebec.

Dr. Peet reports observations made on 232 persons doing constant reading, under uniform conditions of the incidence of presumed deficiencies of vitamin A and of riboflavin. Treatment produced a small effect (12 per cent) by vitamin A, and a large (57 per cent) by riboflavin. The latter is offset by the large number (42 per cent) of diagnosed riboflavin deficiencies which cleared up without treatment, during three months. Among the remainder, subjective improvement in "eyestrain" was slightly more common than in the other groups. The importance of suitable controls thus receives new emphasis in the current discussion of this subject.

A Study of a Selected Group of Women Employed on Extremely Fine Work, Ida Mann, D.Sc., F.R.C.S. and Dorothy Archibald. *British Medical Journal,* March 18, 1944, published monthly by The British Medical Association, Tavistock Square, London W. C., England.

The ability to perform fine work depends on a number of factors, whose relative importance and essential degree were studied

by these Oxford fellows. The factors are: refraction, visual acuity, muscle balance, accommodative power, and psychological adjustment to the work. The experimental group consisted of 28 women, aged 15 to 40, employed on inspection of spiral filaments for light bulbs.

A full battery of tests shows that individuals capable of prolonged fine work without fatigue or other symptoms possess an extremely highly developed stereoscopic sense and muscle balance at the near point. The factors on which judgment of fitness for close work should be based appear to be (1) binocular balance; (2) refraction; and (3) psychological stability.

Diabetes and the Eye, Dr. Lawrence, before Royal Eye Hospital Clinical Society, July 16, 1943. *British Journal of Ophthalmology,* November, 1943, published monthly by The British Journal of Ophthalmology, Ltd., 24–27 Thayer Street, W. 1, London, England.

Dr. Lawrence outlines the diabetic defective metabolism, and the changes it makes in relation to the physiology of the eye. Of these changes—change in accommodation; dehydration; retrobulbar neuritis; diplopia; lens opacification; and retinitis—the last is one of the most to be feared, occurring often among the elderly.

Dr. Lawrence urges that ophthalmologists adopt the practice of testing urines and taking blood pressures to help them in reaching an accurate diagnosis.

Duties and Training of an Orthoptic Technician, Walter B. Lancaster, M.D. *American Journal of Ophthalmology,* May, 1944, published monthly by The Ophthalmic Publishing Co., 837 Carew Tower, Cincinnati, Ohio.

Dr. Lancester attempts to define the respective spheres of the ophthalmologist and orthoptist working together. It is the ophthalmologist's duty to make the diagnosis and plan to supervise the treatment. He should report to the orthoptist, ophthalmoscopic findings, visual acuity, refraction, deviations, history; then the orthoptist further diagnoses the case from the standpoint of intelligence and co-operative ability of the patient, and handles the details of orthoptic training. Dr. Lancaster discusses, with a light touch, the question of relationship between the two co-workers.

The orthoptist's best pre-training background is perhaps teaching or work in psychology, since psychological and educational aspects are vital in orthoptics. Some anatomy is necessary; full knowledge of physiology, physiological optics and psychology is important; but one need not have thorough grounding in optometry or medicine.

The Problem of Night Vision, K. Kekcheev. *American Review of Soviet Medicine*, April, 1944, published monthly by the American-Soviet Medical Society, 30 Fifth Avenue, New York 11, N. Y.

The war has sharply divorced the problem of dark adaptation and sensitivity from its former scope of purely academic interest. Russian scientists, investigating means of speeding adaptation and intensifying night vision, concluded that stimulation of other organs induced changes in visual faculties as part of a diffuse autonomic reflex; that the thresholds of night vision varied with the pulse rate, blood pressure level, and respiration. The stimuli most effective proved to be cold (washing the face with cold water) and mild physical exertion. One application of the stimulus can increase night vision 30–50 per cent for 1½ hours, and accomplish adaptation within 5–6 minutes, in contrast with the 25–30 minutes required for normal spontaneous adaptation.

Orthoptics for the Infant Squinter, One to Four Years Old, Edith V. Roth. *American Journal of Ophthalmology*, January, 1944, published monthly by The Ophthalmic Publishing Co., 837 Carew Tower, Cincinnati, Ohio.

The infant is not capable of the mental concentration essential for effective orthoptic treatment, and too early active treatment may result in an enduring distaste for all orthoptic exercises. Milwaukee Children's Hospital tests young squinters for visual acuity, fixation, angle of squint, type of correspondence, fusion and stereopsis. Glasses and/or occlusion may be prescribed if they are considered necessary, but orthoptic exercises are deferred until the child reaches an age of co-operation.

Eye Problems in the Aged, Hendrie W. Grant, M.D. *Journal-Lancet*, June, 1944, published monthly by Lancet Publishing Co., 84 South Tenth Street, Minneapolis, Minn.

This discussion appears as part of a special geriatric issue of the *Journal-Lancet*. Age changes are described as both physiologic and pathologic, being hastened by many low-grade progressive toxemias which accentuate the normal aging of the tissues, and by the stress and tension of living, high living, and the shocks of illness and trauma. Dr. Grant summarizes age changes in the eye as being characterized by sclerosis of the vessels, hyalinization (deposit of hyalin tissue), fatty degeneration and infiltration; degeneration of the pigment epithelium, and colloid degeneration of the glass membrane. The most common causes of visual loss are cataract, glaucoma, and macula degeneration, the last being resistive to treatment.

Eye Injuries in Shipyards, Prepared in the Division of Industrial Hazards by Frank S. McElroy and Arthur L. Svenson. *Monthly Labor Review*, December, 1943, published monthly by the U. S. Department of Labor, Washington, D. C.

Eye injuries constitute more than one-fifth of disabling shipyard injuries; of these, flying particles are responsible for half. This percentage, however, includes only "no-lost-time" accidents. Shipyard work frequently presents several simultaneous hazards, each of which requires specific protection. Welder's flash in only one of six cases occurs from the worker's own arc, often occurring in employees doing entirely dissimilar work in the welder's vicinity.

The authors suggest three preventive measures which, if thoroughly applied, would prevent 75 per cent of eye injuries: (1) more extensive use of goggles by workers in hazardous operations and by those working nearby; (2) more extensive use of screens to shield workers other than operators; (3) segregation of eye-hazard occupations wherever possible. It is also stressed that availability of goggles is insufficient; that enforcement of their wearing is necessary.

Ophthalmia Neonatorum, Conrad Berens, M.D. *American Journal of Obstetrics and Gynecology*, June, 1944, published monthly by The C. V. Mosby Company, 3523–25 Pine Boulevard, St. Louis, as the official journal of fifteen local, state, and national obstetrical and gynecological societies.

Between the school years 1906-07 and 1941-42, percentage of children admitted to schools for the blind because of ophthalmia neonatorum dropped from 28.2 per cent to 5.6 per cent. The silver nitrate treatment is principally responsible.

The effectiveness of various silver compounds is discussed, and reports on recent use of sulfonamides summarized. Sulfonamides failing, penicillin, and then fever therapy, are tried.

Dr. Berens warns that once ophthalmia neonatorum has developed, even the best treatment leaves many blind, and urges safeguards: (1) prenatal prevention—diagnosis and treatment of infections in the prospective mother; (2) postnatal prevention—prophylaxis of the newborn's eyes; and (3) universal use of the most modern and effective methods of treatment.

Strabismus and Its Correction, Oscar B. Nugent, M.D., F.A.C.S., *The Eye, Ear, Nose and Throat Monthly*, April, 1944, published monthly by The Professional Press, Inc., 5 N. Wabash Avenue, Chicago, Ill.

Dr. Nugent opens with discussion of orthoptic treatment, recommending the affiliation with a technician to free the ophthalmologist for diagnosis and surgery. Then is described in detail the author's recessive operation, for which he cites the following advantages: (1) the operation is applicable to any form of ocular deviation in which a recession operation is indicated; (2) the eye can be readjusted on the second or third day after the muscles have recovered from the influence of the anaesthesia and the muscle tone is returned; (3) the technic is simple and uncomplicated; (4) no patch is placed over the eye, but the patient wears his glasses during convalescence; (5) the operation can be performed with the least amount of trauma; and (6) the results are good.

Book Reviews

CORNEAL TRANSPLANTATION WITH FRESH, CONSERVED AND FIXED MATERIAL (EXPERIMENTAL AND CLINICAL OBSERVATIONS). S. I. Shershewskaya. Novosibirsk, 1940.

Corneal transplantation by which the opaque cornea is replaced by clear corneal tissue has restored the sight of many blind people and it is being used at present all over the world. The Russian ophthalmologist, Prof. Filatov, has done a great deal of work in this field. The book by Shershewskaya, Senior Assistant of the State Institute for post-graduate and clinical study in Novosibirsk, gives a most comprehensive and thorough review of the subject. She relates her experimental and clinical work on the possibility of taking and retaining of the transparency of formalinized 4 mm. wide corneal discs.

The first chapter gives a detailed history of keratoplasty starting with Reisinger's first report in 1842, Von Hippel's work on total leucoma, Zirma's famous case in 1907, Elshnig's work in the Prague clinic which served as the basis of keratoplasty all over the world. Elshnig performed 203 corneal transplantations in the years 1908 to 1930, with resulting transparent union of the transplant in 20 per cent. Filatov and his associates performed 455 corneal transplantations during the years 1922 to 1938; in 264 of these the conserved cornea from the cadaver was used and successful results were obtained in about 67 per cent. Castroviejo of the United States published his results of 80 human keratoplastics. Keratoplastic operations are performed at present in all leading eye hospitals of the Soviet Union.

Chapter two deals with a review of the present technic of keratoplasty, fixation of the transplant, complications of the operation, instruments used, partial penetrating, total keratoplasty and alloplasty (the use of an artificial cornea of inorganic material). The author gives a most complete description of methods used with drawings illustrating the operation and instruments used by Elshnig, Filatov, Thomas, Castroviejo, Kraupa, Lowenstein, Lolein, etc.

The keratoplastic material, the indications, the post-operative course and complications are discussed in the third, fourth and fifth chapters. The contraindications for the use of the cornea in the Soviet Union are: syphilis, miliary tuberculosis, septicemia, malignant tumors and diabetes, of the donor; the age, sex and type of blood of the donor are not important. Most favorable results were obtained when using the cadaver's corneae, conserved in whole or citrated blood of the donor at a temperature of 3° C. The time of conservation can be as long as 15 days, although the best time is considered to be not more than four to five days. The transplant is kept dry in Petri's dish with the epithelial surface upward. The interstitial keratitis and leucomas after scrofulous diseases are most favorable for successful keratoplasty, i.e. non-adherent leucoma, with a deep anterior chamber; normal intra-ocular tension, no inflammation of the eye and good physical condition are essential for good results.

The most troublesome complications are: the secondary opacification of the transplant, the appearance of scar tissue behind the transplant and glaucoma. The various methods of combating these complications are reviewed. Filatov obtained good results in treating the opaque transplant by additional keratoplasty about the transplant.

The sixth chapter is devoted to the histogenesis of keratoplasty. The review of the subject indicates that: (1)The cornea has the quality of regeneration; (2) the cornea belongs to transplantable tissues. The histological findings of the transplant by various authors are given. Saltzer's brilliant experiments of transplanting dead organic tissue, formalinized corneal discs and of other authors on regeneration of the cornea give two directions of the union of tissues: (1) A true transplantation with the individual change of the disc (Fuchs, Ascher, Elshnig, Filatov) and (2) that the transplant is slowly absorbed and gradually is substituted by the regenerated tissue of the host, thus the transplant only stimulates the surrounding corneal tissue to regeneration. (Saltzer, Ribbert, Thomas, Castroviejo).

Shershewskaya's own experimental findings are described in the seventh chapter. She undertook the study in order to verify Saltzer's experiments and used penetrating homoplastic corneae, and

the size of the corneal disc was 4 mm. instead of Saltzer's 2 mm. The enucleated rabbit's eye was kept for two days in a 4 per cent solution of formalin, then for four days in Ringer's solution. Thirty-seven operations were done on 37 rabbits, all transparent cornea; only in two was there leucoma after a thermic burn. The union took place in 12 cases, or in 32.2 per cent; of these, three transplants were transparent, one semitransparent and eight opaque. The time of observation was from 9 to 14 months. The low rate of taking was due partly to overcrowded conditions in the animal house as the operated rabbits were not isolated. The taking of the formalinized transplants indicates and confirms Saltzer's experiments that the transplant after a certain time is reabsorbed and is replaced by the young regenerated fibers of the host. The histopathologic findings and records of the operation, also photographs of the eyes, illustrate the experiments.

The eighth and last chapter is devoted to clinical observations. The author performed 35 keratoplasties on 32 patients; of these 24 were unfavorable (total or partial leucomas, faulty light projection and high intra-ocular tension, and the operation was done because of the pressing desire of the patients). Of the 11 favorable cases there were six transparent takings, four semitransparent and one opaque. The technic of the operation with the author's modifications, drawings, a number of tables and detailed histories are given.

Shershewskaya performed five transplantations with formalinized corneal discs and since it was the first attempt on human eyes (except Ascher's one unsuccessful case), she used three most hopeless cases and two with fair indications for keratoplasty. She obtained one opaque, two semitransparent, one transparent and, in the fifth, the transplant was lost. Thus her work with formalinized discs on animals and human eyes proved that taking of the transplant is possible, only the fixing liquid has to be less irritating than formalin, the use of formalinized corneal discs would solve the problem of the donor. The histologic examination of the discs in rabbits showed no definite border of the transplant as the stroma of the host would blend with the fibers of the transplant. The postoperative course with the fixed discs runs similar to the course of unfixed transplants.

—Olga Sitchevska, M.D.

THE READABILITY OF CERTAIN TYPE SIZES AND FORMS IN SIGHT-SAVING CLASSES. Harold J. McNally. New York: Bureau of Publications, Teachers College, Columbia University, 1943.

Mr. McNally's book represents an attempt scientifically to determine satisfactory type sizes and forms for the use of sight-saving class pupils. He defines readability as "the extent to which a given type size and form lends itself to being read with absence of visual effort." At the outset the author informs us that examination of physiological and ophthalmological research revealed no entirely satisfactory method of measuring visual fatigue. It would seem obvious that scientific evidence cannot be determined unless one begins with definite and positive criteria. However, the author draws particularly from Luckiesh and Moss, and justifies his selection of criteria—which were (1) involuntary eye-blink (2) reading speed and (3) visibility—as measured by the Luckiesh and Moss Visibility Meter.

One chapter, entitled "Conditions of the Experiment," tells us that seventy-two pupils from New York public schools were used. Tables describe the visual difficulty with Snellen and near-vision reading for each subject tested. Readability of 12–14–18 and 24–point type was tested; enlarged typewriter and machine duplicated materials were included, and a full description of testing conditions and methods is presented.

Another chapter presents the thesis and the author's use of "analysis of variance"—the experimental design developed by R. A. Fisher, which provides for the most satisfactory "estimate of error" yet developed.

Mr. McNally analyzes and interprets his findings, stating that they are not at all definite, and suggests several possible interpretations. He does believe, however, that the results of the study will not permit the conclusion that any one of the experimental types is preferable to any of the others. He bases this conclusion upon strict interpretation of statistical results. This is undoubtedly open to question, for in the same paragraph it is stated "that in spite of the lack of statistically significant difference, however, there is a *possibility* that, for the subjects used in this study, there are differences in the readability of the type forms investigated, but they were obscured by operations of some other factors or com-

binations of factors." Observation on the part of sight-saving class teachers and supervisors would incline toward the acceptance of the latter statment and not toward Mr. McNally's stated conclusion.

The final conclusion at which the author arrives is "that studies of readability cannot be conclusive until and unless some more valid and sensitive criterion of visual fatigue, or of visual effort expended is developed." For the reader anxious for new and helpful information concerning type sizes and forms which should be used for sight-saving classes the study is a disappointment, for it contributes no reliable scientific data.

GLADYS DUNLOP MATLOCK

Briefer Comment

THE SIGHT SAVER. C. J. Gerling. New York: Harvest House, 1943.

As the author himself states in his introduction, this book is intended "for general easy reference by the average person on matters pertaining to the eye, sight, and their care." Subjects are arranged alphabetically, under both technical and non-technical terms, so that the searcher is not turned away by lack of comprehension of the terminology. A comprehensive system of cross-references enables one to delve as far into a subject as he wishes.

INDUSTRIAL SAFETY. Roland P. Blake, Ed. New York: Prentice-Hall, 1943.

This volume is intended as a handbook for workers in all industries and does contain much information of immediate and practical value to the worker. However, it seems most appropriate for such specific workers as foremen and safety supervisors rather than for the ordinary machine operators. Management, as represented by these employees, will make the most intelligent use of it.

The safety engineer planning an eye protection program will find pertinent advice under the chapters, Circumstances Surrounding Accidents; Plant Inspection; Layout and Arrangement; Guarding of Metal-Working Machines; Methods of Promoting Safe Practice; The Safety Inventory; First Aid; and Personal Protective Equipment.

THE 1943 YEAR BOOK OF THE EYE, EAR, NOSE AND THROAT. Louis Bothman, M.D., and Samuel J. Crowe, M.D. Chicago: The Year Book Publishers, Inc. 1943.

This annual anthology of pertinent literature is a guide for the hurried practitioner. The index makes the contents readily accessible for reference, and the "practice quiz" which the editors report was very favorably received this year, is again an item.

THE WORLD AT MY FINGER TIPS. Karsten Ohnstad. New York: The Bobbs-Merrill Company, 1942. 348 p. ill.

Karsten Ohnstad began to lose his sight when he was sixteen. A year of treatments, operations, and false hopes intervened before the day when his doctor presented him with a card bearing the symbols of the Braille alphabet. In that year the boy talked to men with all types of eye injuries and diseases, and began to develop that zestful interest in people which was to carry him through his blindness.

Karsten's boyish sense of humor was tickled by the problems of getting about without the aid of sight, and his first sense of being cut off from normal people came when he found himself doing something ludicrous and no one laughed.

Many odd bits of information about the world of the blind are given. Although he was aware, for instance, that in 1940 cars, trains and airplanes were streamlined—he had run his hands over the lines of cars and of minature planes—in his dreams all of them appeared with the straight-up-and-down lines of 1927 models. And in spite of the fact that sensory stimulation was now predominantly auditory, his mental images remained visual, and mental images of color, form and pattern remained curiously sharp.

The World at My Finger Tips is an informative guidebook to the world of the sightless, as well as providing acquaintance with an appealing and gallant personality.

Contributors to This Issue

Eleanor Brown Merrill, as Executive Director of the National Society needs no introduction to REVIEW readers. As announced, she has recently been made President of the National Health Council.

Jack P. Cowen, M.D., formerly a practicing ophthalmologist in Chicago, is now Lt. Commander, USNR, U. S. Naval Supply Depot, Brooklyn, N. Y.

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Joseph Lo-Presti, M.D., is assistant surgeon (R) United States Public Health Service, assigned to the Society as consulting ophthalmologist.

Book Reviewers: **Olga Sitchevska, M.D.,** New York, N. Y., is Assistant Surgeon, New York Eye and Ear Infirmary, and Attending Ophthalmologist, Infirmary for Women and Children; **Gladys Dunlop Matlock,** Detroit, Michigan, formerly Supervisor of Braille and Sight-Saving Classes of Detroit, has been in charge of summer courses for sight-saving class teachers at Wayne University, the University of Chicago, Tulane University, the University of Southern California, and for the past two years, at Columbia University.